



MEMORANDUM

DATE: August 21, 2013

FROM: Brian A. Borgstadt, PE, District Engineer

SUBJECT: City of Covington
Hawke Property Draft EIS – Planning Action

Please accept the following comment and corrections for information in the Final EIS documentation:

Section 3.10, Page 3-149 Water Supply

Water that would be provided to the subarea will be supplied by Covington Water District, as the area is within the District's King County Coordinated Water System Planning service area (CWSP). The Hawke property and other property in the subarea will need to be annexed to the District's corporate boundary before system extensions and water availability can be confirmed. However, the District is able to provide timely and reasonable service.

The District is currently completing the Water System Plan Update (WSP) due for DOH approval in June 2014. The subarea lies within the District's Retail Service Area for growth planning.

The District no longer has two storage tanks at the Tank 2 site. Tank 2A was demolished and Tank 2B was refurbished to provide seismic stability. There is currently 4 Million gallons of storage available on site and it is available at a static hydraulic grade of 660 feet.

In addition, the District has performed a study for potential alignment of a major transmission main as part of the District's Capital Improvement Program (CIP). The CIP project is designated M34 in the 2007 WSP. The project is needed to connect the vicinity of the existing Tank 2 site from the current end of distribution at 204th Avenue to an existing main and casing under SR 18 at SE 248th Street. This project will be necessary to serve the subarea in the future as it traverses the subarea to some extent.

The District's planning report for the above project is provided for your use in planning for the area. Alternatives for connecting the District's 660 pressure zone to the existing 650 pressure zone across the Jenkins Creek drainage may develop as plans for the

subarea go forward. The District remains interested in close communication and cooperation as this process continues. Thank You.

COVINGTON WATER DISTRICT
M-34 204TH AVE SE 660 TO 650 ZONE PROJECT
TECHNICAL MEMORANDUM NO. 2
ALTERNATIVES ANALYSIS
FINAL DRAFT
July 2010

COVINGTON WATER DISTRICT
M-34 204TH AVE SE 660 TO 650 ZONE PROJECT

PLANNING EVALUATION

**TECHNICAL MEMORANDUM
NO. 2**

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1.0 BACKGROUND AND PURPOSE

The Covington Water District (District) proposed the M-34 204th Ave SE 650 to 600 Zone Project to connect the existing 660 pressure zone to the 650 pressure zone allowing a more reliable, redundant water supply to the 650 zone. In the initial planning evaluation, summarized in Technical Memorandum No. 1 – Planning Evaluation (TM1), the project goals and design criteria were established, and preliminary environmental and geotechnical information was gathered in proximity to the proposed transmission main that would connect the two zones. Additionally, it was determined that it is hydraulically feasible to meet level of service and design criteria with a 16-inch main connecting storage Tanks 2A and 2B to the existing 12-inch stub out near State Route 18 (SR 18) and then connecting to the current distribution piping in the 650 zone.

On March 23, 2010, Workshop No. 2 – Alternatives Selection was held to choose three specific transmission main route alternatives using the preliminary planning data. The purpose of this technical memorandum (TM) is to provide detailed analysis of the selected alternatives based on the project goals and criteria previously established. Ultimately the findings in this analysis will be used to score the alternatives and select the preferred route at Workshop No. 3 – Alternative Selection.

2.0 SELECTED ALTERNATIVES

Three alternatives were selected at Workshop No. 2 based on the design criteria and project goals outlined in TM1. A fourth alternative was added by the consulting team after the workshop to address potential constructability and permitting concerns with the two previously proposed transmission main alternatives. The four alternatives are presented in Figure 1 and described in detail below.

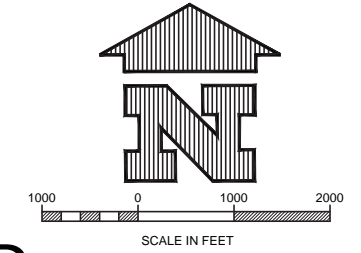
2.1.1 Alternative 1 – West Alignment

2.1.1.1 *Brief Description*


Alternative 1 connects the 660 zone to the 650 zone through a 16-inch transmission main running from the existing piping in the subdivision west of storage Tanks 2A and 2B to the 12-inch stub out located at SR 18. The transmission main would connect into the 660 zone near the intersection of 201st Ave SE and 258th PL, cross the gas pipeline right-of-way (ROW), head north east just outside the western border of the natural gas ROW, break north into the Johnson property and existing access easement, ~~and finally~~ and finally west along SE 248th to the connection at SR 18.

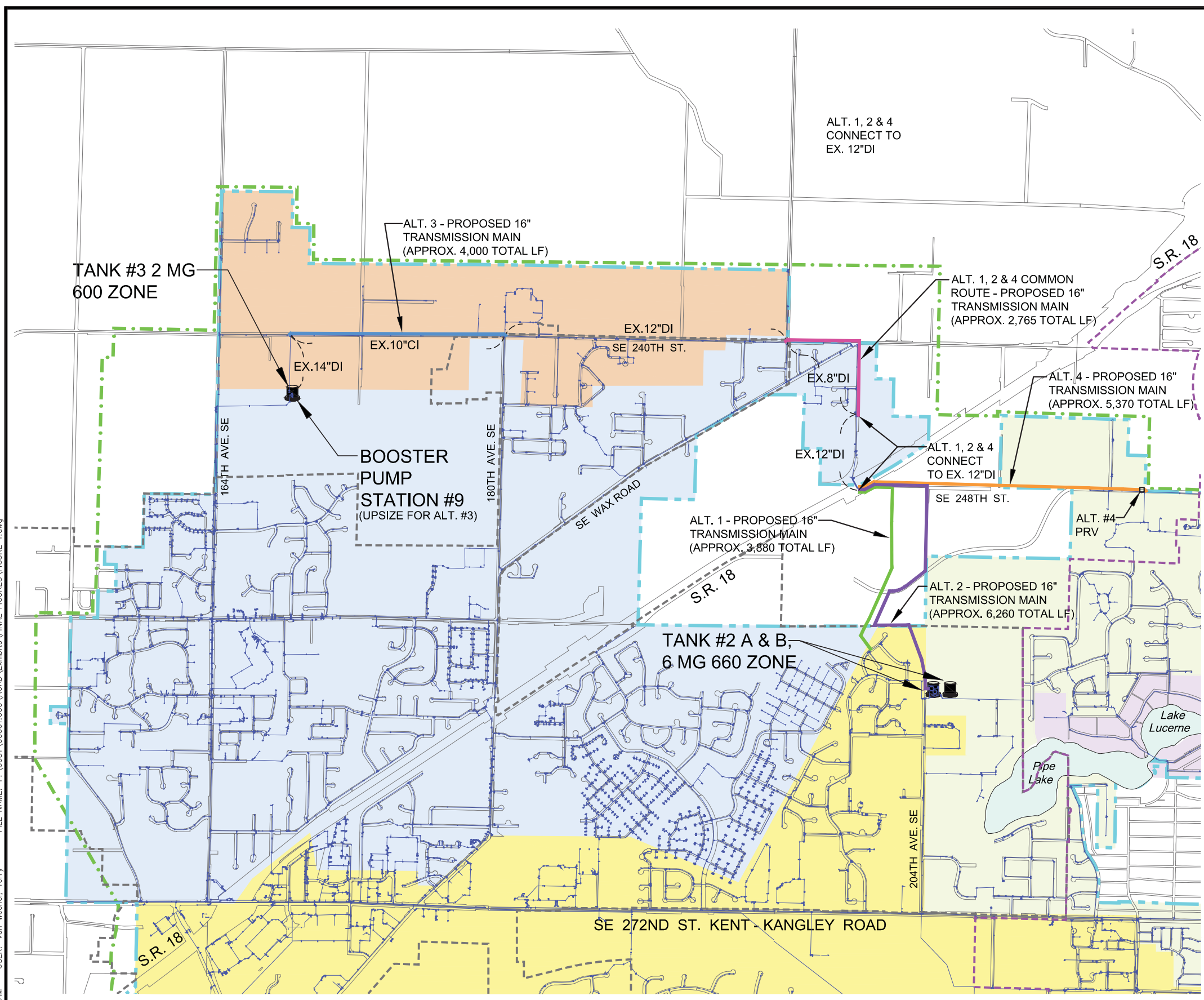
COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN PRESSURE ZONES AND ALTERNATIVES



LEGEND

- ALTERNATIVE #1
- ALTERNATIVE #2
- ALTERNATIVE #3
- ALTERNATIVE #4
- ALT. 1, 2 & 4 COMMON ROUTE
- EX.8"DI EXISTING WATERMAIN & SIZE
- - - MAPLE VALLEY CITY LIMITS
- - - COVINGTON CITY LIMITS
- . . - . COORDINATED WATER SYSTEM PLAN (CWSP) SERVICE AREA
- - - CWD CORPORATE BOUNDARY
-  WATER STORAGE TANK
- 600 PRESSURE ZONE
- 625 PRESSURE ZONE
- 650 PRESSURE ZONE
- 660 PRESSURE ZONE
- 770 PRESSURE ZONE



PLOT DATE: 5/14/2010 7:20 AM USER: Van Wachel, Terry FILE NAME: F:\0031\00001.000\ACAD\Exhibits\FINAL FIGURES\FIGURE 1.dwg

2.1.1.2 Current Land Use

This alignment encounters a wide variety of land uses. The southerly end of the transmission main begins in a dense residential neighborhood inside the Urban Growth Boundary. The alignment continues to the west into a utility corridor with two large natural gas mains with a fenced pipeline facility, although the surface of this area is used as a public trail. On the west side of the gas mains, the land is used as a gravel mine with a concrete and asphalt production facility. Further north, the alignment enters residential property but at a much lower density. The northerly portion of this alignment is within improved King County and Washington State Department of Transportation (WSDOT) ROW.

2.1.1.3 Zoning

There are four different zoning classifications along this alignment, within two different land use agency jurisdictions. The City of Covington drainage parcel, the Northwest Pipeline parcel, and the southerly Hawk parcel lie within the City of Covington. The City and Northwest Pipeline parcels are zoned *Medium Density Residential* and the Hawk parcel is zoned *Mineral*.

The northerly Hawk parcel and the Johnson parcel are within King County jurisdiction. The Hawk parcel is zoned *Mining* and the Johnson parcel is zoned *Rural Residential RA-5*, which means a minimum 5-acre lot size for newly developed lots.

2.1.2 Alternative 2 – East Alignment

2.1.2.1 Brief Description

Alternative 2 connects the 660 zone to the 650 zone through a 16-inch transmission main running from storage tanks 2A and 2B to the 12-inch stub out located at SR 18. The proposed alignment would connect directly in to the storage tanks, head northwest through the broadleaf parcel, west along the southern edge of the Johnson property, northerly just outside the eastern border of the natural gas ROW, easterly along Lund road, north along the extension of 204th Ave SE to SE 248th Street, and finally west along SE 248th to the connection at SR 18.

2.1.2.2 Current Land Use

The proposed Broadleaf plat is currently vacant land awaiting development. The Hawk parcel is used as a gravel mine on the west side of the gas mains and is vacant land with some steep slopes on the east side of the gas mains. The Lund Road is a semi-developed road that appears to be primarily used by ATV users and hikers. It is not maintained by King County as a public road.

2.1.2.3 Zoning

The proposed Plat of Broadleaf lies within the City of Covington and is zoned *Low Density Residential*. The Hawk parcel lies within King County jurisdiction and is zoned *Mining*.

2.1.3 Alternative 3 – New Pump Station

This alternative envisions building a new pump station or expanding the existing pump station on the District's own parcel. The parcel is owned by the District. Zoning is similarly not a concern because the site already contains utility facilities and is therefore not restricted from this type of expansion.

Meeting the District's level of service criteria in the 650 zone will require upsizing the Tank 3 BPS to 3,200 gpm at 40-feet total dynamic head (TDH). In addition, excessive velocity in the 10-inch line in SE 240th Street requires increasing the line size to 16-inch (velocities are still greater than 8 feet per second (ft/sec) using a 12-inch line).

2.1.4 Alternative 4 – 770 Zone Connection

2.1.4.1 *Brief Description*

Alternative 4 would connect the 770 zone on the east side of the District to the 12-inch stub out located at SR 18 through a new 16-inch transmission main along SE 248th. This route begins at the intersection of SE 248th Street and 216th Avenue SE. The new transmission main follows the alignment of the extension of SE 248th Street westward across developed public right of way, private road, and private property, then back into the public ROW at 208th Avenue SE. From this point, the main continues west on SE 248th Street to the point of the common alignments near SR 18, then follows that common route.

2.1.4.2 *Current Land Use*

The Alternative 4 alignment is either on public ROW or private residential land. Where the use is private, the alignment is along property lines. A portion of SE 248th Street west of 214th Avenue SE is signed as "End County Road" although the Assessor's Map shows the platted road continuing to the west. This is not unusual where the County chooses to end their maintenance.

2.1.4.3 *Zoning*

Zoning in this area is RA-5 and is within King County jurisdiction.

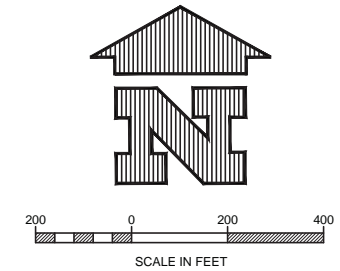
3.0 ALTERNATIVES ANALYSIS

3.1 Alternative 1

An aerial view of the proposed transmission main route unique to Alternative 1 is presented in Figure 2. A close-up of the piping modifications common to Alternatives 1, 2, and 4, and adjacent to the 600 zone, is presented in Figure 3.

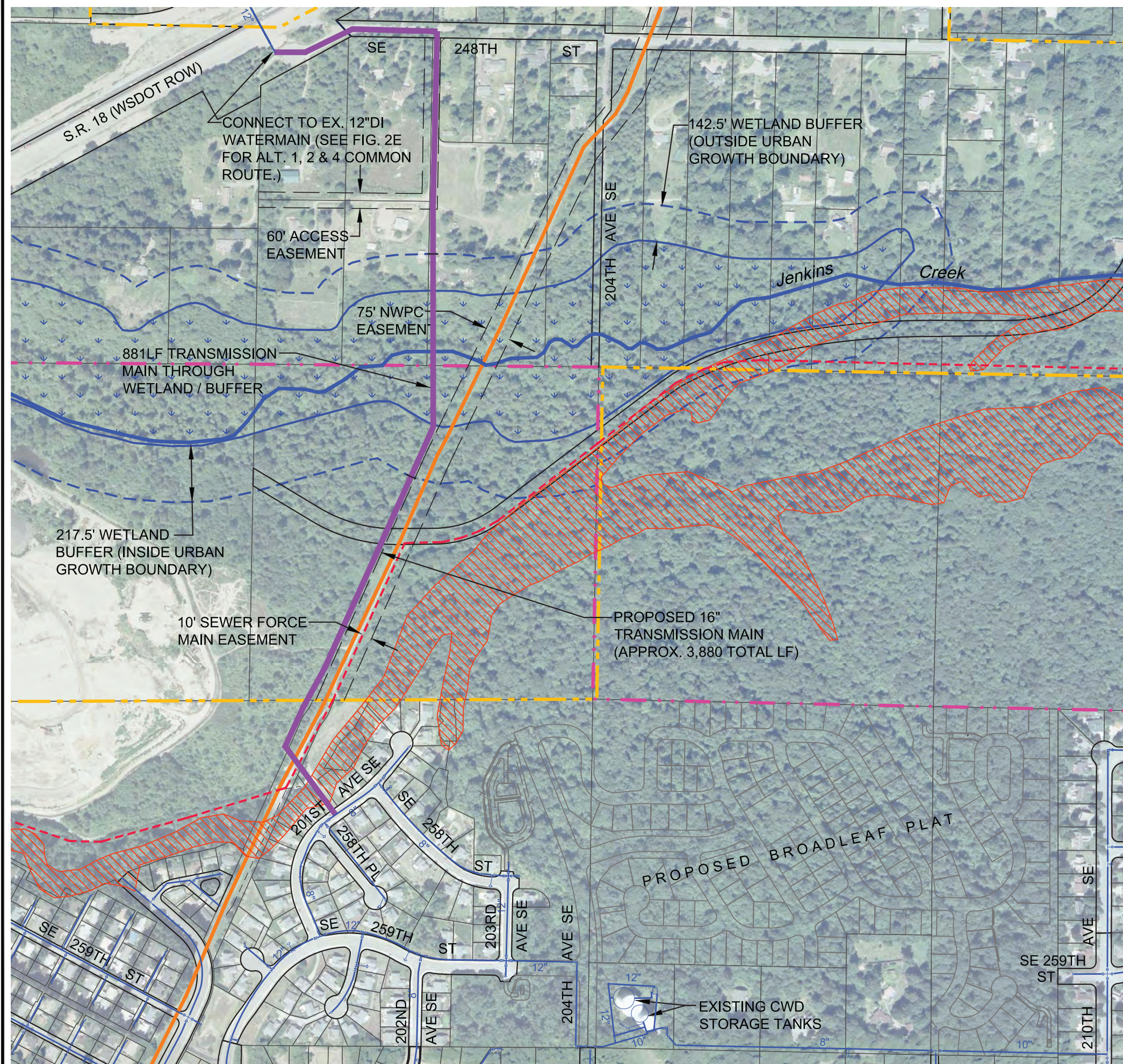
COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVE 1 WEST ALIGNMENT



LEGEND

- PROPOSED WATERMAIN
- GAS PIPELINE
- - - CWD CORPORATE BOUNDARY
- EXISTING WATERMAIN
- . - . URBAN GROWTH BOUNDARY
- - - ABANDONED FORCE MAIN
- ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ APPROXIMATE WETLAND BOUNDARY
- / / / / / / / / APPROXIMATE STEEP SLOPE AREA



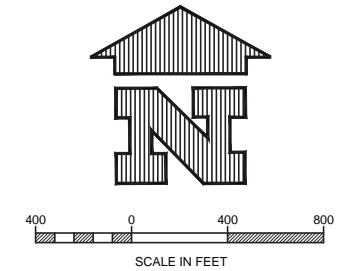
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FIGURE
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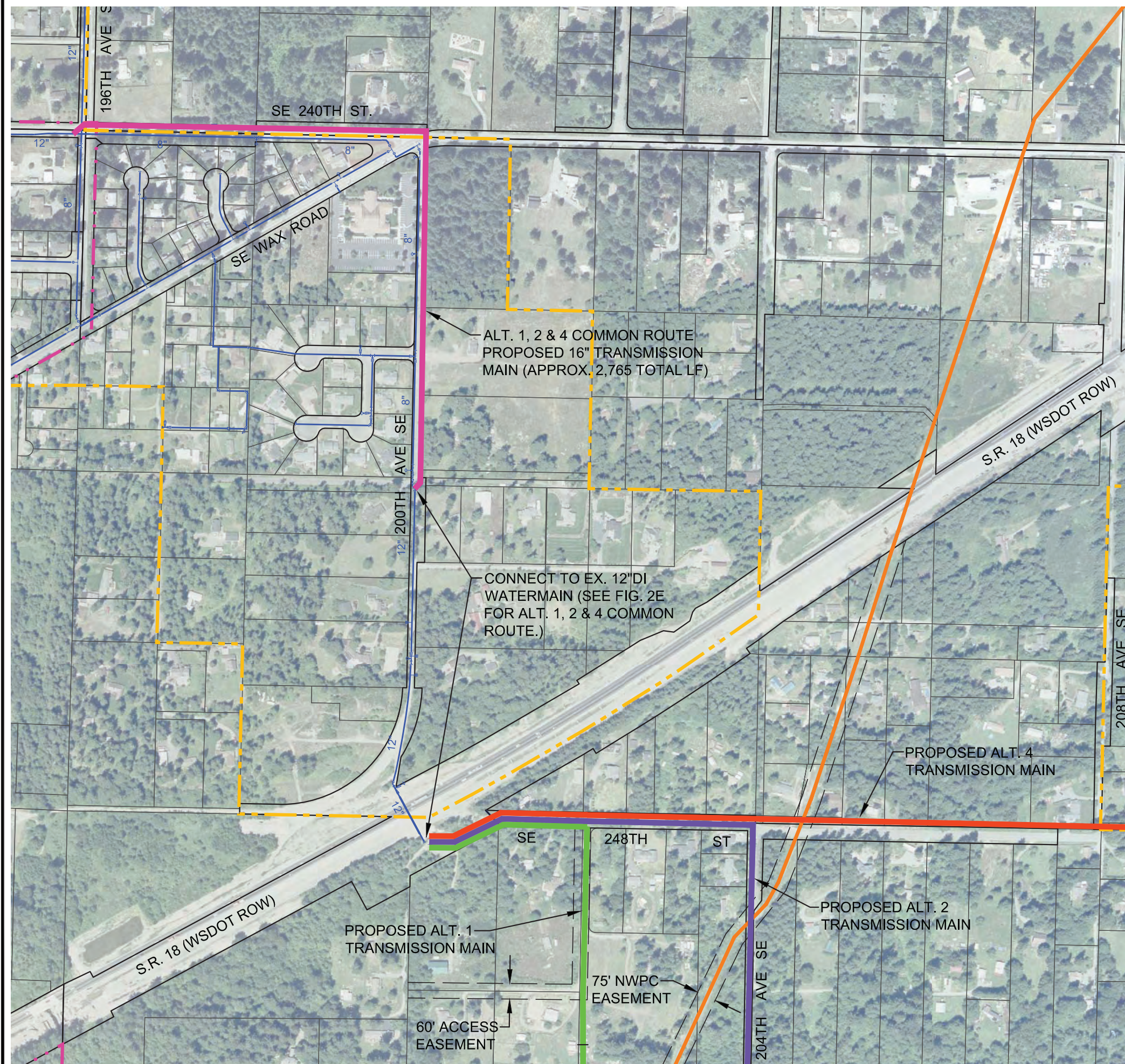
COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVES 1, 2 & 4 COMMON ROUTE



LEGEND

- ALT. 1, 2 & 4 COMMON ROUTE
- ALT. 1 PROPOSED ROUTE
- ALT. 2 PROPOSED ROUTE
- ALT. 4 PROPOSED ROUTE
- GAS PIPELINE
- - - CWD CORPORATE BOUNDARY
- EXISTING WATERMAIN
- . . . URBAN GROWTH BOUNDARY



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FIGURE
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3

3.1.1 Environmental Impact

3.1.1.1 *Rural Areas and Steep Slopes*

There are no steep slopes along Alternative 1; however, sections of Alternative 1 run through rural forested areas that will require restoration. Required surface restoration in these areas will be simple shrubs and groundcovers, with new trees planted in cleared areas except for the 10 feet centered on the transmission main. In a 30-foot clearing, 20 feet of tree re-vegetation would be required and the remainder would be shrubs and groundcover. All restoration will likely have 3 to 5 year inspection and replacement requirements for survival.

3.1.1.2 *Covington Streams and Wetlands*

Both Alternative Route 1 and Alternative Route 2 will pass through Jenkins Creek and an associated wetland midway along the alignments.

Based on Washington State Department of Ecology (Ecology) Salmon Stock Inventory maps, Jenkins Creek is a salmon-bearing stream. Under King County Code, Jenkins Creek would be regulated as a Type F stream because fish are present and because the stream is not listed as a shoreline of the state. King County Code requires a 165-foot protective buffer around Jenkins Creek.

Based on the U.S. Fish and Wildlife Service National Wetland Inventory map for the project area, the wetland associated with Jenkins Creek is a palustrine forested, seasonally flooded wetland. King County (the County) categorizes wetlands using the Ecology Wetland Rating System for Western Washington. Based on this rating system, the wetland associated with Jenkins Creek is a Category I wetland with a habitat functions score of 29.

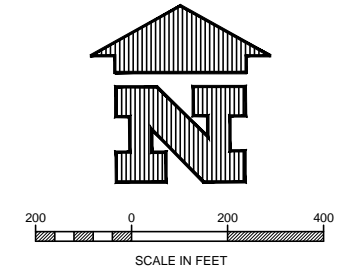
King County Code requires varying buffer widths depending on whether the wetland is located within the Urban Growth Boundary and on the intensity of the proposed land use. The Urban Growth Boundary bisects the wetland as presented in Figure 4. Assuming that the water line would be considered a low-intensity land use, King County Code would require a 217.5-foot protective buffer around the Category I wetland inside the Urban Growth Boundary (on the south side of the wetland) and a 142.5-foot buffer around the wetland outside the Urban Growth Boundary (on the north side of the wetland). King County was not able to verify the land intensity of a water line corridor. If King County considers the water line a moderate- or high-intensity land use, wider buffers would be required.

3.1.1.2.1 Impacts

Both route alternatives for the proposed M-34 water supply line pass through Jenkins Creek and a Category I wetland. If the water line is installed through open-cut trenching, impacts will occur to Jenkins Creek, the Category I wetland, and their buffers. Approximate impact quantities are summarized in Table 1. These impact quantities were based on a 30-foot-wide area for clearing and grading along both route alternatives.

COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN WETLAND AREAS



LEGEND

- GAS PIPELINE
- - - CWD CORPORATE BOUNDARY
- EXISTING WATERMAIN
- . . - . URBAN GROWTH BOUNDARY
- - - ABANDONED FORCE MAIN
- ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ APPROXIMATE WETLAND BOUNDARY

NOTES:

1. 165' STREAM BUFFER NOT SHOWN SINCE IT IS ENTIRELY ENCOMPASSED BY THE SITE WETLAND AND ITS BUFFER.
2. WETLAND BOUNDARY WAS ESTIMATED BASED ON SITE OBSERVATIONS ALONG PROPOSED ALTERNATIVE ROUTES, KING COUNTY IMAP INFORMATION AND AERIAL PHOTOGRAPH INTERPRETATION.

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FIGURE
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4

These estimated impact quantities do not include any additional impacts that may occur associated with construction access or staging areas. If directional drilling is determined to be a viable option, it is possible that wetland, stream, and buffer impacts may be avoided.

Table 1 Estimated Wetland, Stream, and Buffer Impacts – Alternative 1 Alternatives Analysis Covington Water District			
Alternative	Wetland Impact (square feet)	Stream Impacts (square feet)	Buffer Impacts (square feet)
Alternative 1	12,000	300	11,000

3.1.1.2.2 Mitigation

King County will likely require mitigation for any impacts to wetlands, stream, or their buffers. Mitigation requirements for stream impacts include replacing an amount of biological functions equal to or greater than the amount impacted by construction, which must be created in the same aquatic area reach at a 1:1 ratio, or in the same drainage sub-basin at a 3:1 ratio if on-site mitigation is not possible. For the proposed water supply line project, mitigation would likely include restoring the stream channel and placing large woody debris in and adjacent to the channel.

Because the proposed project is an underground utility corridor instead of an impervious building or parking lot, the County may not require the standard wetland mitigation ratios found in the King County code. A pre-application meeting with the County would determine the County's wetland mitigation expectations. Wetland mitigation requirements could range from restoring the impacted wetlands after construction (by replacing native soil with the topsoil on top and replanting the area with native species) to creating new wetlands on an adjacent parcel of land.

Because no wetland mitigation banks are available for the site vicinity, the County would require that wetland impacts be mitigated on site if possible. The County's standard wetland mitigation requirements (in accordance with King County Code) vary depending on whether wetland reestablishment, rehabilitation, replacement/recreation, and/or enhancement is proposed (see the County Standard Wetland Mitigation Ratios Table 2). Wetland reestablishment is restoring wetland functions in an upland area that was formerly a wetland. Wetland rehabilitation means restoring wetland functions in a degraded wetland. Wetland replacement/recreation is creating a new wetland in an upland area where a wetland did not previously exist. Wetland enhancement includes such activities as planting native species, removing invasive species, or minor site grading to improve an existing wetland. Because the Category I wetland is relatively undisturbed, wetland rehabilitation and enhancement are not likely valid mitigation options for this project.

Table 2 King County Standard Wetland Mitigation Ratios Alternatives Analysis Covington Water District				
Category	Reestablishment	Rehabilitation	1:1 Replacement or recreation (R/C) and enhancement (E)	Enhancement Only
Category I Wetland (score based on functions)	4:1	8:1	1:1 R/C and 6:1 E	Case-by-case

No set standards for wetland and stream buffer mitigation are given in the King County code. At a minimum, buffer mitigation typically includes replanting the impacted buffer. Often, agencies also require planting native woody vegetation in other parts of the buffer and/or installing habitat features (e.g., snags, downed logs, nesting platforms, and/or duck boxes) in the buffer.

3.1.2 Property Acquisition

This section describes current property ownership, easement, and ROW consideration associated with Alternative 1.

3.1.2.1 *Current Property Owners*

3.1.2.1.1 City of Covington – (parcel # 776040-1060)

The City of Covington is listed as the owner of the drainage parcel within the Plat of Shire Hills Div. No. 1 across which the transmission will be placed. The portion of this tract would cross is the access point from 201st Avenue SE into the tract. Because this is a publicly-owned parcel right of entry has not been pursued. This parcel contains a small sewage lift station located directly in the middle of the access alignment (see Figure 5).

3.1.2.1.2 Northwest Pipeline Corporation – (parcel # 292206-9127)

The District acquired a right of entry that specified their easement across the Hawk parcel but did not mention this parcel. Unlike the easement across the Hawk parcel to the north of Shire Hills, they own this property as a separate parcel so an easement is required.

3.1.2.1.3 Jim Hawk – (parcel # 292206-9162 (South), # 202206-9012 (North))

Mr. Hawk owns several very large adjacent parcels that are collectively leased to the operator of a gravel mine, Lakeside Industries. This alignment proposes to cross two of those parcels. The District acquired an earlier right of entry from Mr. Hawk that did not specify the southerly parcel to the west of Shire Hills but did include the parcel north of Shire Hills. Mr. Hawk previously directed the District to contact the gravel mine operator for site access.

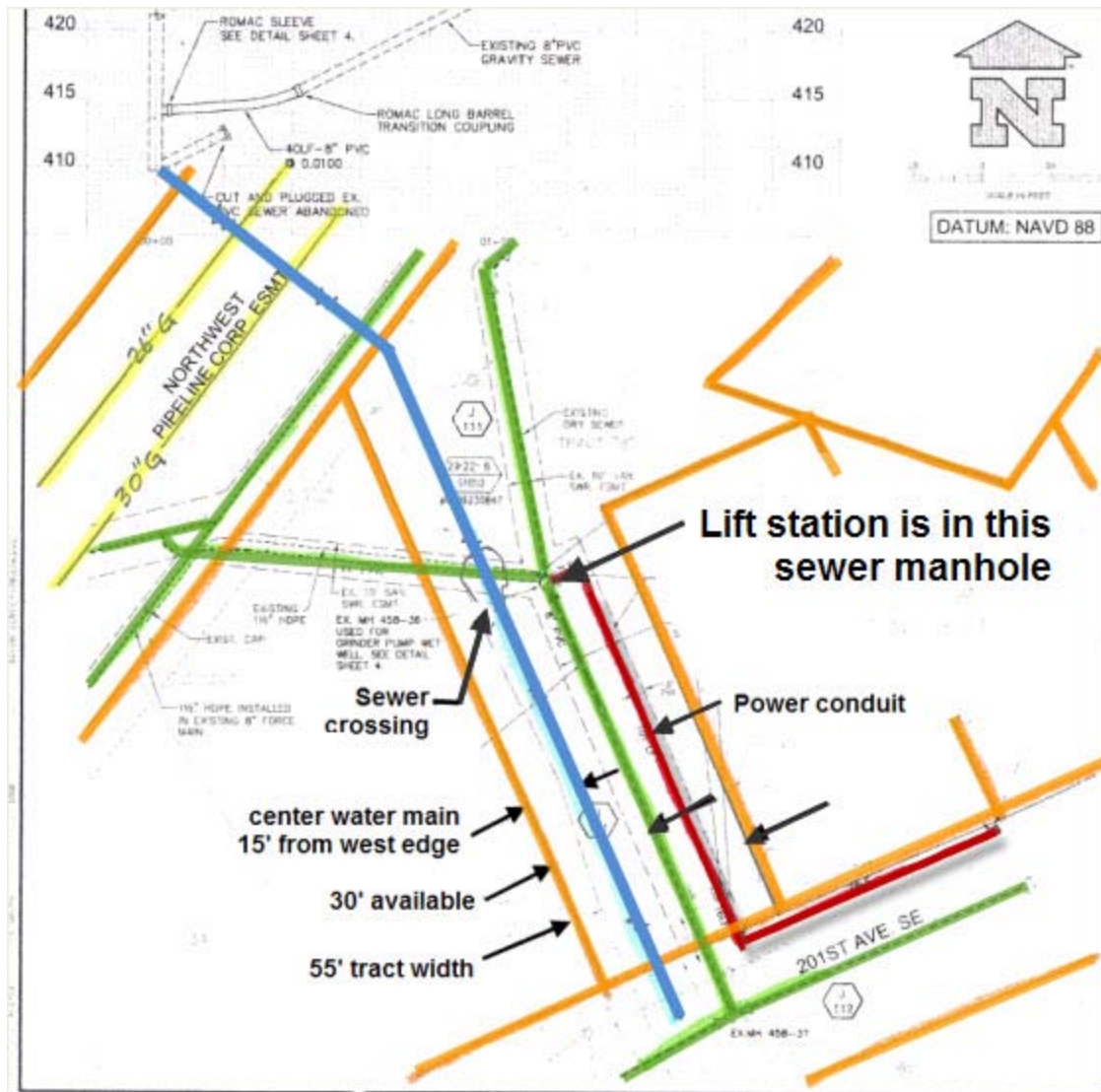


Figure 5 City of Covington Parcel

3.1.2.1.4 Jennifer Johnson – (parcel # 202206-9040)

Scott Wilke, who represents himself as the son of Jennifer Johnson and the resident on the parcel has been contacted several times. Each time he has stated that he represents her interests and has agreed to sign the right of entry agreement. There is no confirmation that he is actually her representative and an easement will require legal review.

Public records indicate that Scott and Dorene Wilke purchased the property in 1993 and it was foreclosed on in 2001 then purchased by Jennifer Johnson three months later. This series of ownership transfers supports Mr. Wilke's assertion because it appears his mother bought the property so he could stay in the house.

3.1.2.2 **Easements**

There are several relevant easements on the Johnson parcel:

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1. The 75-foot-wide gas main easement recorded in 1956.
2. Ingress, easement, and utilities easement along the driveway, recorded as part of the short plat in 1985.
3. Water use and maintenance agreement, share allocation and easement for the small water system serving the 5-lot plat recorded in 1985 which means there could be a small Group B water system, with a well and associated pipes, on this or one of the other parcels in this short plat, all of which lie to the west of the Johnson parcel.
4. Puget Sound Power and Light easement recorded in 1994.

The northerly Hawk parcel includes the 75-foot gas main easement.

Soos Creek Water and Sewer District (SCWSD) owns an easement along the east edge of the Northwest Pipeline parcel for a sewer force main. This easement also includes an abandoned 10-inch ductile iron sewer force main that runs off to the west near the Plat of Shire Hills.

3.1.2.2.1 Restrictions

The water system agreement mentioned on the Johnson deed was not able to be located. There is a well with a protective radius on Lot 2, along with piping and wiring for a small Group B water system. If this alignment is selected the locations of any such facilities will be located during detailed design. Scott Wilke said the well for this water system is located on Lot 2 of the short plat, to the north of the Johnson parcel. Lot 2 is currently owned by Joseph and Caroline Hicks and is the center of the three lots to the north of the Johnson parcel.

Earlier correspondence with Northwest Pipeline indicates that the crossing of the natural gas mains is likely to be best accomplished with a perpendicular crossing. The pipeline is likely to apply specific conditions on design review, site restoration, and construction inspection for the crossing.

SCWSD's Lift Station No. 41 on the City of Covington parcel in Shire Hills poses some potential limitations on construction and alignment. The lift station is small and consists of a simple grinder pump set inside a manhole. The pump power is supplied through a conduit buried on the east side of the access area. There is approximately 30 feet available for a water main alignment on the west side of the sewer line (for reference see Figure 5).

3.1.2.2.2 Requirements

Easements may vary in width, clearing and restoration requirements, and length of time required for construction within the easement and the temporary construction permit area depending on surface conditions, topography, planned type of construction, and proximity of improvements.

The space obtained for permanent easements is typically less than that needed during construction so the two instruments were indentified separately. The requirements for temporary construction easements are presented later in this report. Permanent easements for the constructed transmission main can likely be limited to 10 feet in width in all areas. Because these easements restrict surface uses, they are most often placed in areas where other uses are either already restricted or unlikely, such as along property lines.

3.1.2.3 Right of Way

There are two separate ROW jurisdictions associated with this alignment.

1. The City of Covington governs the ROW within 201st Avenue SE.
2. King County governs SE 248th Street including where it turns to the south at the west end.

The ROW widths and jursdiction in this area are presented in Figure 6.

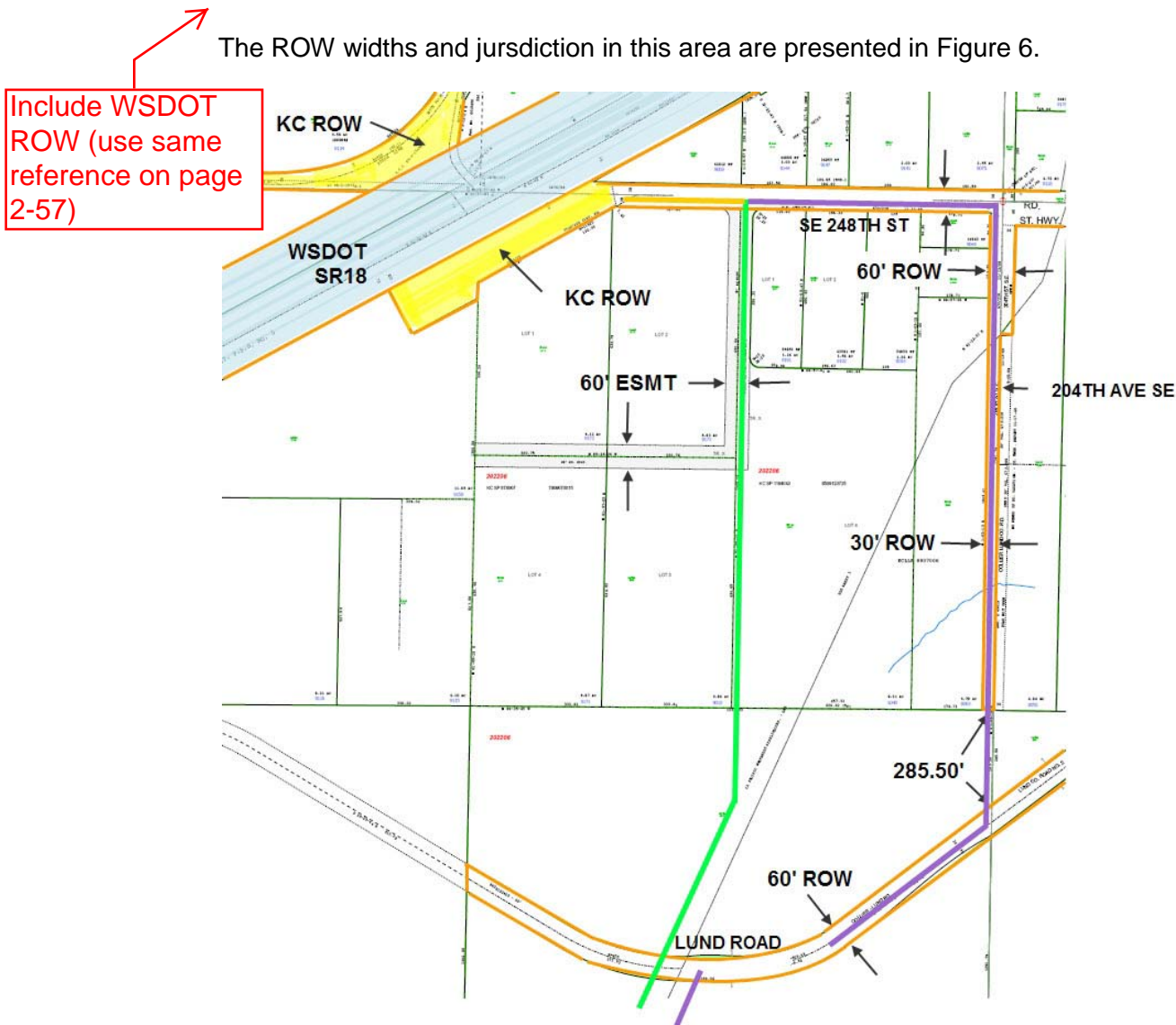


Figure 6 Right-of-Way and Easement Widths

3.1.2.3.1 Conditions and Restoration

The City of Covington ROW is fully improved, with curb, gutter, and sidewalk. The power and other utilities are all underground. Care must be taken during design to identify these utilities and avoid them during construction. Restoration will match typical city requirements and will likely consist of a simple asphalt patch in the area of the water main connection.

The King County ROW is paved with asphalt but does not have any surface paint marking indicating centerline or fogline. Wire utilities are located on poles along the south edge of the asphalt. Large trees are located in the shoulder on the south side very close to the edge of the asphalt in the line of the utility poles. The water main may fit within the gravel shoulder immediately adjacent to the north edge of the asphalt. The asphalt is in good condition and if the main is placed within the asphalt surface, King County may require a full-width overlay if the asphalt is cut inside the fogline. The absence of a painted fogline makes this questionable.

3.1.3 Permitting

The following section describes anticipated permitting requirements for this alignment. The project lies within two land use jurisdictions and three ROW jurisdictions.

3.1.3.1 SEPA

The pipe size and alignment through critical areas will require preparation of a SEPA Environmental Checklist and a SEPA Determination by the District. This is a typical process and no special concerns are anticipated during the SEPA process.

3.1.3.2 Permit Type, Fee, Effort to Prepare, and Schedule

Anticipated permits are shown in Table 3. ROW permits typically have fixed fees, while some permit fees, such as those for grading permits, vary as a result of impacted area. Other permits have no submittal fee.

3.1.3.3 Supporting Studies Required

Work within critical areas is likely to require specific critical areas studies, including wetlands/streams and geological studies. These specialties are already included on the project team and will be tasked with preparing supporting studies. Studies will include Critical Areas Reports for Geotechnical and Environmental aspects, as well as a Biological Evaluation to support wetland and stream crossing.

3.1.3.4 Permit Conditions

Permit conditions are either prescriptive or applied by the permit reviewer, or both. Conditions usually refer to construction timing to reduce traffic or environmental impacts, or to restoration requirements. No unusual permit conditions are anticipated. The conditions expected include:

- Schedule restrictions on the Jenkins Creek crossing

- Dewatering water quality monitoring requirements
- Flagging or fencing of clearing limits
- Asphalt restoration within roadways
- Surface restoration outside of roadways including location-specific hydroseeding and buffer restoration planting
- 3 to 5 years of restoration planting survival monitoring and removal of invasive species in restoration area

Table 3 Permitting Requirements – Alternative 1 Alternatives Analysis Covington Water District					
Agency	Permit Type	Permit Fee	Effort to Prepare	Schedule	Notes
City of Covington	ROW	\$300 - City usually bills utilities directly	Easy	3 weeks	Traffic Control Plan required with permit submittal
City of Covington	Grading	Approx. \$2400 for Critical Areas Exception review plus approx \$700 for grading permit	Easy	3 weeks	Based on 520 If trench 4 ' wide and 4' deep- Project may apply for Critical Areas Exception for required utility line activities
King County	ROW	\$300 - County usually bills utilities directly	Easy	3 weeks	
King County	Clearing and grading permit	Approx. \$5500	Moderate	1-2 months	Based on 2700 If cleared 30' wide and trench 4' deep and 4' wide with 5 hrs of DDES field inspection
Washington Department of Fish and Wildlife	Hydraulic Project Approval	None	Difficult due to quality of wetland	1-2 months	Could be a fish window limiting work to dry conditions
US Army Corps of Engineers	Nationwide Permit 12 for Utility Line Activities	None	Moderate to difficult due to quality of wetland	6-9 months	Federal nexus means delay due to ESA Section 7 consultation
Department of Ecology	Federal Permit 401 for wetland mitigation	None	Moderate to difficult due to quality of wetland	Issued concurrently with Corps Permit 12	Can be issued up to 180 days after Permit 12, but usually issued concurrently
WSDOT	Franchise Amendment	\$500	Fairly easy	3 months	Required for changing size of main inside existing casing

3.1.4 Operations & Maintenance

The majority of the Alternative 1 alignment will be located in or near improved ROW or access easements for ease of operation and maintenance. The southern portion of Alternative 1, as shown in Figure 2, can be accessed from the development to the west of the Tank 2 site as it runs parallel to the Williams gas pipeline alignment. The alignment can be easily accessed from the Williams gas easement until the proposed line turns north on the Johnson property into the existing wetland.

Once the line is within the existing wetland, it will be very difficult to access and maintain if required. Depending on the method of construction used to build the proposed water line across the wetland, it may be impossible to access the line. If the line is constructed using horizontal directional drilling (HDD), the line will be installed at a depth which will make it impossible to access the line. If the line is constructed using open trench construction, there may be opportunity to access the line if required.

The northern portion of Alignment 1 between the existing wetland and the crossing of SR 18 can be accessed from the driveway to the Johnson property. The access driveway is graveled and can be easily traversed for maintenance of the proposed water line.

3.1.5 Constructability/Risk

3.1.5.1 *General Subsurface Conditions*

Geological subsurface conditions were assessed at the Lakeridge Gravel Pit in lieu of performing borings along the potential transmission main route. It was determined that the information available at this nearby location would be sufficient to aid planning level analysis for potential routes. Lakeside Industries' Covington Pit is located about 400 feet west of Alternative 1, as shown in Figure 7. This borrow pit and the potential water main alignments are located in the Jenkins Creek floodplain, which is a remnant of a glacial outwash plain formed during the recession of the last glacial ice in the Puget Lowland.

Although some areas in the southeastern corner of the borrow pit (closest to the M-34 project corridor) were ambiguous because they may have been covered by regrading strippings, it appears that a very coarse deposit of gravel and cobbles with little to no fine matrix only occurs in the upper 10 feet. Below that, the soil is still coarse, but appears to have a sandy or silty matrix down to about 25 feet deep. At a depth of about 25 feet below the ground surface, although the primary constituents are gravel and scattered cobbles, the matrix is comprised of clay and silt in the southeastern corner of the pit. To the west of the exposures mentioned above, there are exposures as high as 50 feet of stratified sand, sand and gravel, and coarse open-work gravel and cobbles. Photographs of the observed subsurface condition and where in the pit these conditions were observed are presented in Figure 7. As indicated by the pit operator, the soil conditions are quite variable laterally.

LOCATIONS OF PHOTOGRAPHS OF GEOLOGIC
CONDITIONS IN SE CORNER OF LAKESIDE PIT,
COVINGTON, WA.



A photograph showing a steep, eroded hillside. The slope is composed of light-colored, loose soil and numerous small to medium-sized rocks. Sparse vegetation, including small shrubs and grasses, is scattered across the slope. In the foreground, a large, dark, cylindrical object, possibly a pipe or culvert, lies horizontally across the rocky ground. The background features a dense forest of tall evergreen trees.



ROTH HILL

FIGURE
NO.
7

3.1.5.1.1 Planned Construction within Easements

This alignment primarily assumes open-cut trench construction, which requires side-casting excavated material, laying the pipe, then backfilling the trench. For relatively shallow depth construction, as envisioned here, the excavated material does not require a large area. Space is required for entering the easement area, stockpiling pipe and any imported backfill materials such as pipe bedding, and room to work for construction of thrust blocks, bore pits or other construction. The project requires relatively simple linear construction at shallow depths so the easement requirements are also relatively simple.

However, it is possible that bearing soil in the wetland areas may be deeper than the bottom of the trench, requiring either over-excavation and structural backfill or possibly pile-supported construction. Either of these options requires considerably more expense and construction time.

The gas main crossing and the stream crossing each present the possibility for requiring wider easement areas, as described below, to allow construction other than simple open cut methods.

3.1.5.2 Easement Surface Conditions and Proximity of Improvements

Most of the easement areas are not maintained to a high level, such as manicured lawns and gardens. Within the City of Covington parcel and across the Northwest Pipeline parcel, simple gravel or crushed surfacing may suffice. The easement across both Hawk parcels may be as simple as hydroseeding. If the wetlands or their buffers are entered, expect to provide a fully designed and maintained restoration planting as a permit condition, as described earlier in this report. If an open-cut on Jenkins Creek, the creek bed restoration will likely consist of a designed mixture of gravels. Because the Jonson parcel is mostly open, hydroseeding may suffice except for the driveway surface where crushed rock may suffice.

3.1.5.2.1 City of Covington Parcel

There are homes on both sides of the City of Covington drainage tract that will require careful attention to construction methods and impacts to minimize the District's risk of exposure to construction-based claims.

The two large gas mains (26-inch and 30-inch) are located on the west side of the Northwest Pipeline parcel. SCWSD construction record drawings from 1975 sewer construction indicate the 26-inch gas main is centered 20 feet from the west edge and the 30-inch gas main is centered 40 feet from the west edge. Field verification is necessary.

SCWSD's Lift Station No. 41 sits in the middle of the access portion of the City of Covington parcel. There are various electrical conduits and sewer lines leading to and from the station (for reference see Figure 5). The tract is 55 feet wide in the area and the sewer mains run nearly up the center. There power conduit for the lift station lies on the north side but the south side is relatively open with about 30 feet of clear space. There are many buried

utilities in this area but none that appear to restrict construction of a 16-inch water main. There are trees and shrubs on the City parcel, but none of them appear significant (Figure 8, detail 1).

3.1.5.2.2 Northwest Pipeline Parcel

Further north along the gas main alignment, but still within the Northwest Pipeline property and still south of the Hawk parcel, there is a fenced gas facility. However, the proposed alignment to the west side of the pipeline property (Figure 8, detail 2) suggests there will be no conflict with this facility.

The gas pipeline easement is kept generally clear of trees and is graded relatively smooth. While the “trail” is maintained by a group known as Friends of the Trail, Northwest Pipeline does not consider their property a trail.

3.1.5.2.3 Hawk and Johnson Parcels

There is second growth forest on both sides of the easement, with alder, fir, maple, vine maple, and understory shrubs (Figure 8, detail 3). Further west, the gravel pit is still active so alignment of the water main should be adjacent to the gas easement.

Traveling north, the proposed alignment diverges from the gas easement and heads straight north toward the west line of the Johnson parcel. The surface cover is forest and then wetlands associated with Jenkins Creek.

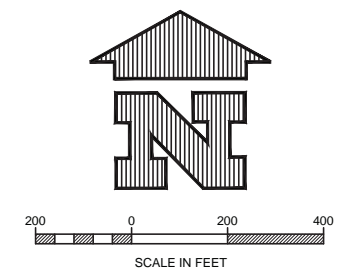
The alignment crosses Jenkins Creek at approximately the south line of the Johnson parcel (Figure 8, detail 6). During the February 18, 2010 site visit the creek was running full and was fairly wide and shallow (Figure 8, details 4 and 5). During the April 15, 2010 site visit along the proposed alignment, the creek was higher and wider than in February. The wetland is very densely vegetated and muddy. There are several very large trees (greater than 36-inch diameter) along the alignment.

The surface of the potential alignment on the Johnson parcel is mostly clear and undeveloped north of the wetland boundary. However, within the wetland area adjacent to the Hawk parcel, the surface is densely vegetated and contains many large trees. The stream has many shallow side channels and the ground is very muddy through the wetland. A person walking begins to sink after a short time standing in one location. While there is some debris such as tires that seem to have been washed into the area, the surface is relatively pristine and undisturbed. Permitting agencies are likely to look unfavorably on any proposals to clear vegetation along this alignment, even with a high quality restoration plan.

The shared access driveway appears to be centered on the 60 foot access easement so the property lines in Figure 6 appear reasonably representative. The main would be best aligned along the east edge of this driveway to reduce clearing and restoration requirements and should be located on a single parcel (Johnson) to reduce complexity and number of required easements.

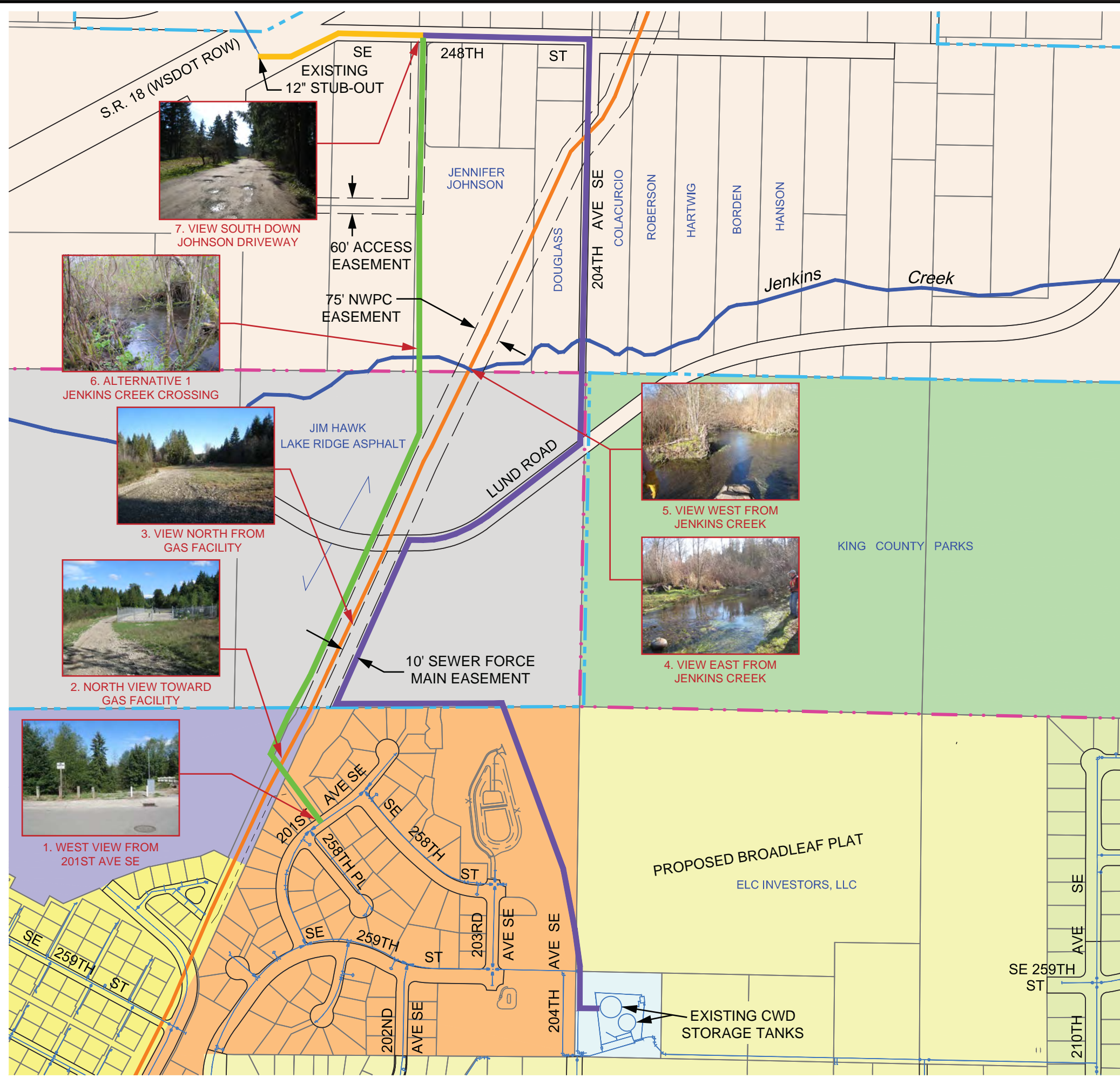
COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVE 1 DETAIL MAP



LEGEND

	ALTERNATE ROUTE 1
	ALTERNATE ROUTE 2
	COMMON ROUTE
	GAS PIPELINE
	CWD CORPORATE BOUNDARY
	URBAN GROWTH BOUNDARY
	COVINGTON - HIGH DENSITY RES.
	COVINGTON - MED. DENSITY RES.
	COVINGTON - LOW DENSITY RES.
	COVINGTON - MINERAL
	COVINGTON - PUBLIC UTILITY
	MAPLE VALLEY - LOW DENSITY RES.
	KING COUNTY - RURAL RES.
	KING COUNTY - MINING
	KING COUNTY PARKS



At the north end of the Johnson parcel, along the entry driveway, there is an adjacent house to the east that may not be aware of the actual property lines (Figure 8, detail 7). While the house is plenty far away from the potential pipe alignment, the surface is maintained by that land owner (Caroline and Joseph Hicks).

SE 248th Street west to the SR 18 connection poses no concerns for structures or improvements. There are utility poles along the edge of the south side and trees near the edge of both sides of the asphalt, so the main will likely have to go in the roadway (for reference see Figure 10, detail 7). The road is not painted so there is not technically a fogline to stay outside of to avoid overlaying the road. This issue could be negotiated with the King County ~~RWO~~ inspector.

3.1.5.3 Construction Impact

3.1.5.3.1 Open Trench Construction

There are no conditions along Alternative 1 that would preclude the use of open-trench construction. However, seasonal variations in Jenkins Creek stream levels will affect construction conditions. When the water level is high sidewall caving will occur and dewatering will be necessary. It is reported that the creek dries during the summer time and construction at that time would be prudent.

3.1.5.3.2 Horizontal Directional Drill (HDD)

The most significant challenge to HDD will be the recessional outwash that is particularly coarse in this locality. As described in the general subsurface conditions above, gravel, cobbles, and boulders are the norm, and open-work, nested particles are not uncommon. If conditions at the selected pipeline crossing are consistent with those exposed in the Lakeside Pit, the upper very coarse layer (Figure 7, lower right) could be cased and then the drill could be advanced through the sandy gravel and then the till-like layer (Figures 7 and 4) with a clayey/silty matrix that underlie the very coarse surficial stratum. Although the till-like layer contains gravel and scattered cobbles, the matrix of the formation is likely to stay open and not collapse during drilling and back-reaming. The biggest risk (as exposed in the central part of the Lakeside Pit) is the next lower layer, which does not have a fine-grained matrix and has zones of open-work gravel and cobbles (Figure 5). Such conditions, if they exist in the potential pipeline alignments, could pose difficulties for advancing the drill, keeping the drill hole open, and maintaining fluid circulation. While it is impossible to ascertain the subsurface conditions on the alignment several hundred east of the borrow pit, **in the opinion the geotechnical engineer the chance of success would be about 50 percent**, if conditions are similar to those in the Lakeside Pit.

If HDD methods are to be used on parts of this project, they should be undertaken only after thorough subsurface explorations. It is recommend that a sonic core boring be advanced to a depth of about 80 feet approximately in the middle of the Jenkins Creek floodplain, where the depth of the HDD would be greatest. This could be accomplished with relatively little disturbance to the environment if it was located in or adjacent to the Williams

pipeline corridor. This boring would provide information regarding feasibility of the HDD concept for this project. Eventually, borings should also be drilled on both edges of the floodplain to further characterize the subsurface conditions.

3.1.5.3.3 Easement Width

The space obtained for permanent easements is typically less than that needed during construction so two instruments are separately identified. Permanent easement requirements are discussed in the section on property acquisition. Temporary construction permits are “easements” that expire after a specified time and are therefore not really easements. Widths vary depending on topography, planned depth of construction, need for staging areas and vehicle movement, along with other construction factors. Simple linear construction of a 16-inch transmission across a relatively flat and clear area can typically occur within a 30 foot wide permit area.

City of Covington Parcel

This area is limited by the existing infrastructure and the temporary construction permit can likely be 30 feet wide.

Northwest Pipeline Parcel

It is likely that no excavation will be allowed so a bore and jacked casing should be expected. To cross under the gas mains a fairly deep casing may be necessary. Bore launching and receiving pits would be required.

Hawk Parcels

A bore pit with staging area may be required on the southerly Hawk parcel across from the City of Covington parcel, therefore a rectangle of approximately 40 feet by 15 feet may be required. The temporary construction permit for the main along the west side of the gas easement can likely be 30 feet wide. An additional similarly-sized bore pit area may be required if Jenkins Creek is not crossed by open cut methods.

Johnson Parcel

A 30 foot wide temporary construction permit should suffice. Because of the potential for impact on the shared driveway there is a chance that the other users of the driveway could require temporary construction permits or possibly compensation for inconvenience.

3.1.6 Level of Service

The level of service outlined in TM1 cannot be maintained with the piping configuration proposed for Alternative 1. The required 20 pounds per square inch (psi) residual pressure required during fire flows cannot be met at Tahoma High School. The existing piping within the residential area at the south end of the proposed alignment just west of Tanks A and B appears to be the limiting source of headloss. The pressures are still not met even with

upsizing a lengthy section of 12-inch pipe that runs through the corner of the 600 zone at the North end of the alignment.

3.1.7 Schedule

3.1.7.1 *Survey/Geotechnical Schedule*

Once the Basis of Design Report (BODR) has been completed and approved by the District and a scope and budget for design has been approved, effort can immediately begin work on the surveying and geotechnical investigations of the selected alternative. The level of effort required for the geotechnical investigation will be dependent on the type of construction proposed as greater geotechnical detail is required for an HDD project.

3.1.7.2 *Easement Acquisition Schedule*

The level of effort required for easement acquisition is dependent on the willingness of the property owner to work with the District. If the property owner is willing to grant an easement the entire process can be accomplished in a couple of weeks. If the property owner is not willing, it may take longer to negotiate for the easement or possibly go through the condemnation process. It is expected that the easement process could be completed in a two month time period during the design phase.

3.1.7.3 *Design Schedule*

A three step process has been identified for the design phase of the project. First, a 60% design will be submitted for review by the District. Revisions will be incorporated and refined for a 90% submittal before the Final design is submitted. A five month process for the design phase of the project is identified.

3.1.7.4 *Permitting Schedule*

The major factor affecting the project schedule for Alternative 1 will be the need to obtain a Corps of Engineers permit for the crossing of Jenkins Creek. It is likely that a Corps permit will be required whether the line is constructed using open trench construction or by horizontal directional drilling. It is possible that it will take less time to obtain the permit if the line is constructed using HDD. In an attempt to reduce the overall project schedule, it is recommended that permits are submitted based on the 60% design. Based on an estimate of 6 to 9 months to acquire a Corps permit, a 7 month permit process is proposed. This will be more than enough time to acquire the additional permits required beyond the Corps permit.

3.1.7.5 *Construction Schedule*

This project should be constructed in the summer when the water in Jenkins Creek and associated tributary's are at their lowest. Based on a 2009 site visit, the water in Jenkins Creek dries up in the summer, although it is not known at what depth the groundwater shows up. The following (Table 4) schedule summarizes the anticipated time for each of the

items listed above along with a proposed construction schedule showing the construction in the wetland occurring in the summer months.

Table 4 Alternative 1 Schedule Alternatives Analysis Covington Water District	
	2010
	J J A S O N D J F M A M J J A S O N D
Design	
Predesign	
Survey/Geotech	
Final Design	
Easement Acquisition	
Permitting	
Construction	
Transmission Main Online	

Adjust years from 2010-2011 to 2011-2012, don't spend time modifying months or anything else. Or, you can include statement in text above that "schedule provides general duration that can be adjusted based on the actual starting time of design".

3.1.8 Cost

3.1.8.1 *Mitigation Costs*

Mitigation costs for this project are difficult to accurately estimate, particularly because the mitigation requirements may be different than the standard mitigation ratios in the King County Code. In addition, mitigation costs can vary from \$2 to \$100 per square foot depending on the complexity of the project design and construction requirements. To give a general mitigation cost estimate range, Shannon & Wilson estimated: (1) the cost of restoring the stream channel, wetland, and buffers after construction is complete; and (2) the cost of restoring the stream channel and buffers and mitigating the wetland impacts at a 4:1 ratio. For the second cost estimate, the following assumptions were made:

- Wetland mitigation would be limited to excavating and disposing of 1 to 3 feet of soil, planting native vegetation, installing a temporary irrigation system, and monitoring for five years.
- Stream mitigation would be limited to placing large woody debris in or near reconstructed stream channel.
- Buffer mitigation would be limited to planting native species in disturbed buffer areas.
- No irrigation water costs were included.
- No property or easement purchase costs were included.

The general estimated cost for restoration only is \$107,000. For restoration plus 4:1 wetland mitigation the cost ranges is estimated at \$240,000 to \$300,000.

3.1.8.2 Easement Valuation

Roth Hill uses a standard industry easement valuation formula to determine recommended payments for permanent easements and temporary construction permits. The formula uses the County Assessor's property valuation and lot square footage to determine a per-square-foot valuation and applies a 25% increase in value to adjust for market value typically being higher than the assessed value. This per-foot value is then adjusted down as a function of the land owner's ability to use the easement area for other purposes. For example, if the easement runs under power lines or within a wetland setback, it has less (if any) development potential for the land owner and might offer as little as 10% of the market value for a pipeline easement. If the easement bisects a parcel so as to limit future development potential, the value of the easement, in terms of the owner's opportunity cost, would be much higher. A typical 10 foot easement along a property line, within typical building setbacks, is valued at 25% of the market value. The resulting value is referred to as the "easement fee" and is determined by multiplying the easement square footage by the square foot fee value.

For temporary use of property, referred to as a temporary construction permit, a factor is added to discount for temporary impacts and multiplied on a per-month basis. The formula looks like this:

Assessed lot value x 1.25 = **Market value**

Market value x 0.25 = **Fee value** (use a lower factor like 0.10 for areas the land owner can not develop, eg. sensitive areas)

Fee value/parcel size x easement area = **Easement fee**

Market value/parcel size x 0.01 x No. of months x permit area = **Permit fee** (where No. of months = construction time)

3.1.8.2.1 Time Assumed for Temporary Construction Permit Valuation

This alignment assumes typical open-cut trench construction for the majority of the construction. With typical production rates of approximately 200 feet per day, including final surface restoration, the range of construction times on the parcels from as little as one week to as much as 4 months. The methods selected for crossing the gas pipeline and Jenkins Creek pose a potential for slower per-day production in these limited areas. The time for each parcel is included in the individual parcel calculation.

3.1.8.2.2 Easement and Permit Values

This alignment requires easements and temporary construction permits from the following land owners, with the fees calculated in Table 5. These calculations are based on

preliminary easement sizing, which would change slightly during final design. It is not recommended paying for an easement from the City of Covington due to the low land value and in the interest of interagency cooperation. A lower fee and market values for the City of Covington, Northwest Pipeline, northerly Hawk, and Johnson parcels was applied due to current uses, use restrictions, and lack of other potential uses.

Table 5 Easement and Permit Values – Alternative 1 Alternatives Analysis Covington Water District					
Parcel Number	Owner	Easement Size (ft²)	Easement Fee (\$)	Temp. Permit Size (ft²)	Temp. Permit Fee (\$)
776040-1060	City of Covington	2,000	\$4	6,000	\$5
292206-9127	Northwest Pipeline	800	\$13	2,400	\$16
292206-9012	Jim Hawk	13,400	\$848	40,200	\$1,017
202206-9162	Jim Hawk	2,330	\$368	6,990	\$177
202206-9040	Jennifer Johnson	12,700	\$1,155	38,100	\$1,386
Totals			\$2,388		\$2,601

3.1.8.3 Infrastructure Improvements

The infrastructure improvement costs have been broken into several areas depending on the type of construction being proposed. Costs have been estimated depending on whether the proposed 16-inch transmission main is being constructed in an existing ROW, easement, wetland buffer, the wetland itself, or down a steep slope. The costs include construction of the proposed improvements from the Tank 2 site through the crossing of SR 18 and all the way to the intertie at SE 240th Street and 196th Avenue SE. Table 6 summarizes the location of the proposed construction including lengths and the estimated cost for the infrastructure improvements for Alternative 1.

In an attempt to compare open trench construction with the construction of the proposed line using a trenchless technology such as HDD, a second cost estimate for Alternative 1 using HDD was developed. It should be noted that this is a very rough estimation of potential costs and should not be used in determining the recommended alternative. The potential use of HDD should be reviewed and analyzed further during the design phase of the project if a pipeline construction alternative is selected. This recommendation is based on the amount of potential risk involved with this type of construction and the need for extensive geotechnical investigations. While cost of the infrastructure improvements may be higher for a HDD project, it has the potential to reduce the wetland mitigation costs and the length of time required for permitting. Table 7 summarizes the estimated costs associated with HDD construction.

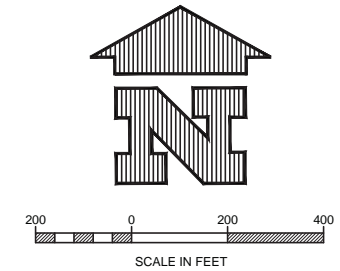
Table 6 Infrastructure Improvements - Alternative 1 Open Trench Alternatives Analysis Covington Water District					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	16-inch DI Water in ROW	670	LF	\$175	\$117,250
2	16-inch DI Water in Easement	2,150	LF	\$150	\$322,500
3	16-inch DI Water in Wetland Buffer	365	LF	\$175	\$63,875
4	16-inch DI Water in Wetland Open Trench on Piles	520	LF	\$1,050	\$546,000
5	16-inch DI Water on Steep Slope	130	LF	\$500	\$65,000
6	Gas Main Crossing	1	LS	\$25,000	\$25,000
7	16-inch DI Water in ROW (north of SR 18)	2,700	LF	\$175	\$472,500
				Subtotal	\$1,612,125
				Tax (8.6%)	\$138,643
				TOTAL	\$1,750,768

Table 7 Infrastructure Improvements - Alternative 1 HDD Alternatives Analysis Covington Water District					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	16-inch DI Water in ROW	670	LF	\$175	\$117,250
2	16-inch DI Water in Easement	2,150	LF	\$150	\$322,500
3	16-inch DI Water in Wetland Buffer Directional Drill	365	LF	\$800	\$292,000
4	16-inch DI Water in Wetland Directional Drill	520	LF	\$800	\$416,000
5	16-inch DI Water on Steep Slope	130	LF	\$500	\$65,000
6	Gas Main Crossing	1	LS	\$25,000	\$25,000
7	16-inch DI Water in ROW (north of SR 18)	2,700	LF	\$175	\$472,500
				Subtotal	\$1,710,250
				Tax (8.6%)	\$147,082
				TOTAL	\$1,857,332

As noted in Section 3.1.6 Level of Service, Alternative 1 as shown in Figure 2 cannot meet the needs of the District with regard to fire flow and residual pressure due to the headloss associated with connecting the new transmission main to the existing subdivision piping. Based on that information, a separate cost estimate was generated to evaluate new transmission main from the existing Tank 2 site to an intersection point with Alternative 1 by going through the Broadleaf development. In essence, this constitutes the first 1,560 feet of Alternative 2 as seen in Figure 9.

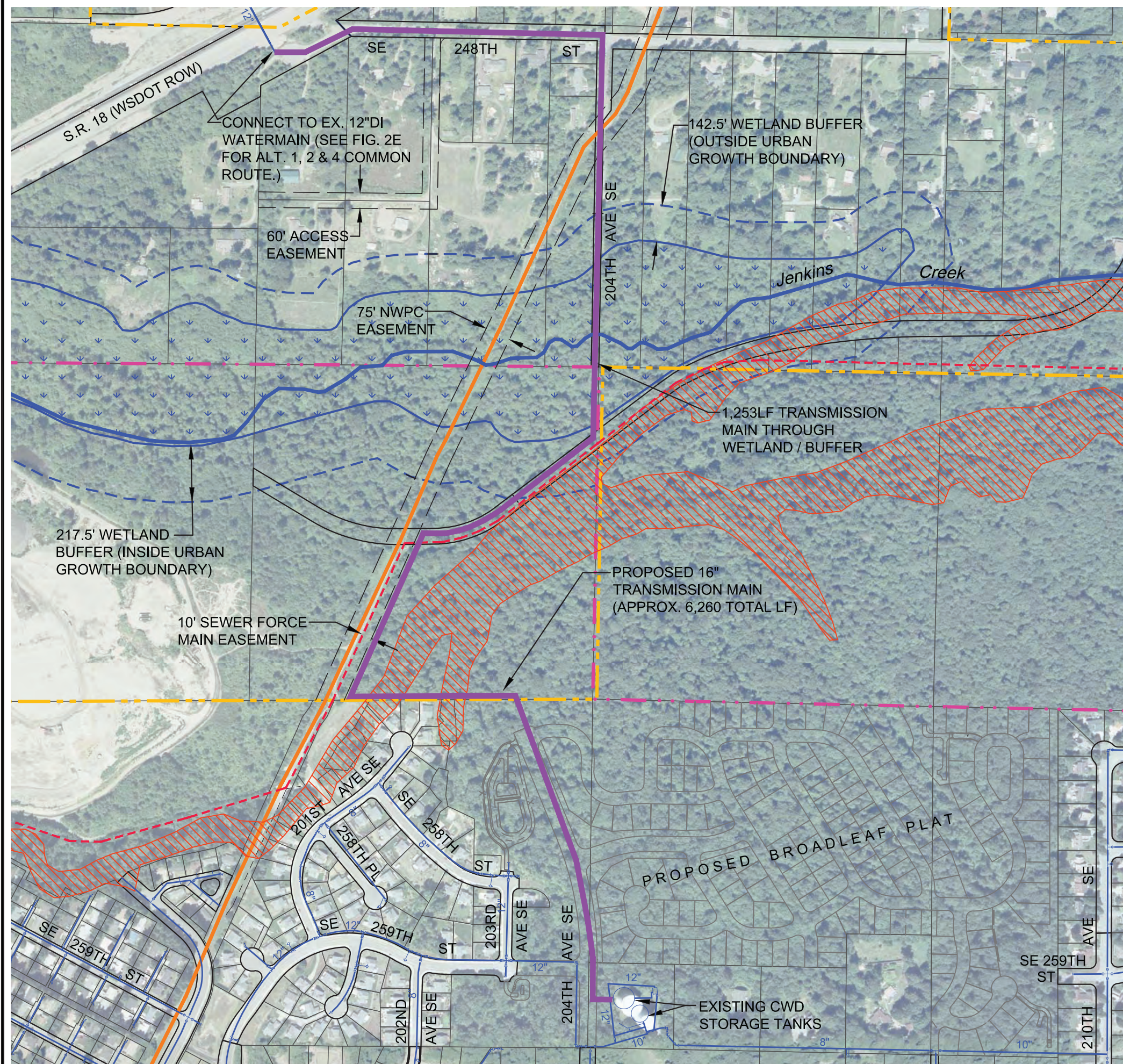
COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVE 2 EAST ALIGNMENT



LEGEND

- PROPOSED WATERMAIN
- GAS PIPELINE
- - - CWD CORPORATE BOUNDARY
- EXISTING WATERMAIN
- . . URBAN GROWTH BOUNDARY
- - - ABANDONED FORCE MAIN
- ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ APPROXIMATE WETLAND BOUNDARY
- / / / / / / / / APPROXIMATE STEEP SLOPE AREA



ROTHHILL

Roth Hill, LLC Tel 425.869.9448 www.rothhill.com
11130 NE 33rd Place, Suite 200 Bellevue, WA 98004

FIGURE
NO.
9

The cost to connect directly to the tank can be found in Table 8 and would need to be added to either of the tables above to make Alternative 1 viable.

Table 8 Infrastructure Improvements - Alternative 1 Modification Alternatives Analysis Covington Water District					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	16-inch DI Water in ROW	1,090	LF	\$175	190,750
2	16-inch DI Water in Easement	220	LF	\$150	33,000
3	16-inch DI Water on Steep Slope	250	LF	\$500	125,000
				Subtotal	\$348,750
				Tax (8.6%)	\$29,993
				TOTAL	\$378,743

3.1.8.4 Summary

Table 9 summarizes all of the anticipated costs associated with Alternative 1. The table includes costs for permit fees, wetland mitigation, engineering (design, permitting, and construction), easement acquisition, District fees, and construction costs. The engineering costs are based on 25% of the anticipated construction cost before tax and the District fees are based on 7% of the construction cost before tax. A 20 percent contingency factor was applied to account for additional project uncertainties.

Table 9 Total Project Cost - Alternative 1 Alternatives Analysis Covington Water District		
Description	Costs for Open Trench Construction	Costs for HDD Construction
Construction Cost w/WSST	\$2,129,511	\$2,236,075
Engineering (Design, Permitting & Construction)	\$490,219	\$514,750
Permit Fees	\$9,700	\$9,700
Easement Costs/Temporary Construction Permits	\$4,989	\$4,989
District Legal & Administration	\$137,261	\$144,130
Wetland Restoration & Mitigation	\$300,000	\$0
Subtotal	\$3,071,680	\$2,909,646
Contingency (20% rounded)	\$614,000	\$582,000
TOTAL	\$3,685,680	\$3,491,646

3.2 Alternative 2

An aerial view of the proposed transmission main route unique to Alternative 1 is presented in Figure 9. A close-up of the piping modifications common to Alternatives 1, 2, and 4, and adjacent to the 600 zone, is presented in Figure 3.

3.2.1 Environmental Impact

3.2.1.1 *Rural Areas and Steep Slopes*

There are moderate steep slopes along Alternative 2; however the slopes are not steep enough to require any special construction or mitigation requirements beyond that for normal open-trench construction through a rural forested area. Required surface restoration in these areas will be equivalent to those of Alternative 1.

3.2.1.2 *Covington Streams and Wetlands*

As mentioned previously, both Alternative Route 1 and Alternative Route 2 will pass through Jenkins Creek and an associated wetland midway along the alignments.

3.2.1.2.1 Impacts

Approximate impact quantities for Alternative 2 are summarized in Table 10. The impact quantities were based on a 30-foot-wide area for clearing and grading along the route alternatives. These estimated impact quantities do not include any additional impacts that may occur associated with construction access or staging areas. As with Alternative 1, if directional drilling is determined to be a viable option, it is possible that wetland, stream, and buffer impacts may be avoided.

Table 10 Estimated Wetland, Stream, and Buffer Impacts – Alternative 2 Alternatives Analysis Covington Water District			
Alternative	Wetland Impact (square feet)	Stream Impacts (square feet)	Buffer Impacts (square feet)
Alternative 2	18,000	300	13,000

3.2.1.2.2 Mitigation

Mitigation requirements will be nearly identical for Alternatives 1 and 2. See Alternative 1 for a detailed description of requirements.

3.2.2 Property Acquisition

3.2.2.1 *Current Property Owners*

3.2.2.1.1 ECL Investors, LLC – (parcel # 776040-1070)

This company owns the proposed Broadleaf plat and is well known to the District. The Broadleaf plat design includes a water main along this proposed route, although the pipe size will be increased to 16-inch by this project.

3.2.2.1.2 Jim Hawk – (parcel # 202206-9012)

Mr. Hawk owns several very large adjacent parcels that are collectively leased to the operator of a gravel mine, Lakeside Industries. This alignment proposes to cross one of those parcels. The District acquired an earlier right of entry from Mr. Hawk for this parcel. Mr. Hawk previously directed the District to contact the gravel mine operator for site access.

3.2.2.2 Easements

The Hawk parcel includes the 75-foot gas main easement.

SCWSD owns an easement along the east edge of the Northwest Pipeline parcel for a sewer force main. This easement also includes an abandoned 10-inch ductile iron sewer force main that runs off to the west near the Plat of Shire Hills.

The City of Covington is potentially interested in co-locating a trail over the water main easement.

3.2.2.2.1 Restrictions

Crossing the Broadleaf Plat will require coordination as to construction timing with the developer. The planned road along the proposed alignment requires significant cut and fill sections if constructed prior to the plat work.

~~This alignment does not propose to cross the large gas mains.~~

3.2.2.2.2 Requirements

Easements may vary in width, clearing and restoration requirements, and length of time required for construction within the easement and the temporary construction permit area depending on surface conditions, topography, planned type of construction, and proximity of improvements.

Permanent easements for the constructed transmission main can likely be limited to 10 feet in width in all areas. Because these easements restrict surface uses, they are most often placed in areas where other uses are either already restricted or unlikely, such as along property lines.

3.2.2.3 Right of Way

There are two separate ROW jurisdictions associated with this alignment.

1. The City of Covington governs the ROW within 204th Avenue SE, in case any work needs to happen here.
2. King County governs the semi-improved Lund Road and also SE 248th Street including where it turns to the south at the west end.

ROW locations and widths are shown previously in Figure 6.

Similar to
Alternative 1
comment, include
WSDOT.

3.2.2.3.1 Conditions and Restoration

The ROW of 204th Avenue SE south of the District's tanks is fully improved with curb, gutter and sidewalk to the north edge of the plat served by SE 262nd Street. The utilities are underground and the water valves are well-marked. Disturbance of the asphalt seems unlikely but would be minimal if required. Restoration would likely consist of simply patching. The proposed alignment runs across easements (Figure 10, detail 4) until it enters the semi-improved Lund Road, which is a dirt (no gravel) road with deeps ruts and potholes (Figure 10, detail 1). Although shown as King County ROW, this road is not maintained by King County. Construction within this ROW should be permitted and restoration is likely to consist of compaction, grading to drain, and crushed rock surfacing to reduce erosion.

From Lund Road, this alignment turns north and crosses more of the Jim Hawk parcel, which includes wetlands and Jenkins Creek (conditions are similar to Figure 10, details 2 and 3). The alignment enters the ROW of 204th Avenue SE again in the vicinity of Jenkins Creek. It is approximately 540 feet from Lund Road to Jenkins Creek and approximately 310 feet from the north edge of Jenkins Creek to the south end of the improved portion of 204th Ave SE on the north side of the creek. The ROW is 30 foot wide south of the gas main crossing and 60 foot wide north of the gas mains (see Figure 6 for reference). The ROW is 60 feet wide on 204th Avenue SE north of the gas mains but the improvements are the same throughout. The road is patched and generally in fair condition (Figure 10, details 5 and 6). It seems likely King County and the local residents using this as their sole access road would desire a full overlay for restoration. Once the alignment reaches SE 248th Street, the conditions are the same as described above for Alternative 2 (Figure 10, detail 7).

3.2.3 Permitting

The following section describes anticipated permitting requirements for this alignment. The project lies within two land use jurisdictions and two ROW jurisdictions.

3.2.3.1 SEPA

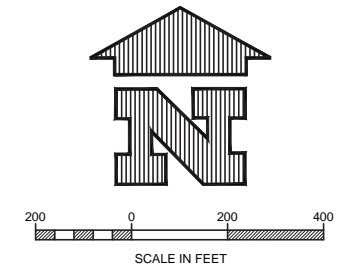
The pipe size and alignment through critical areas will require preparation of a SEPA Environmental Checklist and a SEPA Determination by the District. This is a typical process and no special concerns are anticipated during the SEPA process.

3.2.3.2 Permit Type, Fee, Effort to Prepare, and Schedule

Anticipated permits are shown in Table 11. ROW permits typically have fixed fees, while some permit fees, such as those for grading permits, vary as a result of impacted area. Other permits have no submittal fee.

COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVE 2 DETAIL MAP



LEGEND

	ALTERNATE ROUTE 1
	ALTERNATE ROUTE 2
	COMMON ROUTE
	GAS PIPELINE
	CWD CORPORATE BOUNDARY
	URBAN GROWTH BOUNDARY
	COVINGTON - HIGH DENSITY RES.
	COVINGTON - MED. DENSITY RES.
	COVINGTON - LOW DENSITY RES.
	COVINGTON - MINERAL
	COVINGTON - PUBLIC UTILITY
	MAPLE VALLEY - LOW DENSITY RES.
	KING COUNTY - RURAL RES.
	KING COUNTY - MINING
	KING COUNTY PARKS



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FIGURE
NO.
10

Table 11 Permitting Requirements – Alternative 2 Alternatives Analysis Covington Water District					
Agency	Permit Type	Permit Fee	Effort to Prepare	Schedule	Notes
City of Covington	ROW	\$300 - City usually bills utilities directly	Easy	3 weeks	Traffic Control Plan required with permit submittal
City of Covington	Grading	Approx. \$2400 for Critical Areas Exception review plus approx \$700 for grading permit	Easy	3 weeks	Based on 520 lf trench 4 ' wide and 4' deep- Project may apply for Critical Areas Exception for required utility line activities
King County	ROW	\$300 – County usually bills utilities directly	Easy	3 weeks	
King County	Clearing and grading permit	Approx. \$5500	Moderate	1-2 months	Based on 2700 lf cleared 30' wide and trench 4' deep and 4' wide with 5 hrs of DDES field inspection
Washington Department of Fish and Wildlife	Hydraulic Project Approval	None	Difficult	1-2 months	Could be a fish window limiting work to dry conditions
US Army Corps of Engineers	Nationwide Permit 12 for Utility Line Activities	None	Difficult	6-9 months	Federal nexus means delay due to ESA Section 7 consultation
Department of Ecology	Federal Permit 401 for wetland mitigation	None	Moderate to difficult due to quality of wetland	Issued concurrently with Corps Permit 12	Can be issued up to 180 days after Permit 12, but usually issued concurrently
WSDOT	Franchise Amendment	\$500	Fairly easy	3 months	Required for changing size of main inside existing casing

3.2.3.3 Supporting Studies Required

Work within critical areas is likely to require specific critical area studies, including wetlands/streams and geological studies. These specialties are already included on the project team and will be tasked with preparing supporting studies. Studies will include Critical Areas Reports for Geotechnical and Environmental aspects, as well as a Biological Evaluation to support wetland and stream crossing.

3.2.3.4 Permit Conditions

Permit conditions are either prescriptive or applied by the permit reviewer, or both. Conditions usually refer to construction timing to reduce traffic or environmental impacts, or to restoration requirements. No unusual permit conditions are anticipated. The conditions expected include:

- Schedule restrictions on the Jenkins Creek crossing
- Dewatering water quality monitoring requirements
- Flagging or fencing of clearing limits
- Asphalt restoration within roadways
- Surface restoration outside of roadways including location-specific hydroseeding and buffer restoration planting
- 3 to 5 years of restoration planting survival monitoring and removal of invasive species in restoration area

3.2.4 Operations & Maintenance

Similar to Alternative 1, the majority of the Alternative 2 alignment will be located in or near improved ROW or access easements for ease of operation and maintenance. The southern portion of Alternative 2, as shown in Figure 9, will eventually be accessed from the Broadleaf development to the west of the Tank 2 site. Once through the Broadleaf development, the line will turn west down the steep slope to the east side of the existing gas alignment. The line will be difficult to maintain on the steep slope. The alignment can be easily accessed from the Williams gas easement until the proposed line turns east on the Lund Road ROW. The Lund Road ROW is currently poorly maintained and is generally wet and muddy. The road is also blocked off at the gas alignment. The proposed line would be difficult to maintain both with the Lund Road ROW and into the well developed wetland.

Once the line is within the existing wetland, it will be very difficult to access and maintain if required. Depending on the method of construction used to build the proposed water line across the wetland, it may be impossible to access the line. If the line is constructed using HDD, the line will be installed at a depth which will make it impossible to access the line. If the line is constructed using open trench construction, there may be opportunity to access the line if required.

The northern portion of Alignment 1 between the existing wetland and the crossing of SR 18 can be accessed from the existing 204th Avenue SE ROW. The existing road is paved up to a point approximately 310 feet north of the existing wetland. While the paved surface is narrow, it would be easy to maintain the proposed water line from this point to the SR 18 crossing.

3.2.5 Constructability/Risk

3.2.5.1 *General Subsurface Conditions*

The general subsurface conditions for Alternative 2 are anticipated to be identical to those identified for Alternative 1.

3.2.5.2 *Planned Construction within Easements*

As with Alignment 1, Alignment 2 primarily assumes open-cut trench construction. Requirements are nearly identical to those outlined for Alternative 1. The stream crossing presents the possibility for requiring wider easement areas, as described below, to allow construction other than simple open cut methods.

3.2.5.3 *Easement Surface Conditions and Proximity of Improvements*

Most of the easement areas are not maintained to a high level, such as manicured lawns and gardens. The easement across the Hawk parcel may be as simple as hydroseeding. If the wetlands or their buffers are entered, it can expect to provide a fully designed and maintained restoration planting as a permit condition. If an open-cut Jenkins Creek, the creek bed restoration will likely consist of a designed mixture of gravels.

Generally, this alignment offers relatively low costs for easement surface restoration.

3.2.5.3.1 Broadleaf Plat

Restoration on the Broadleaf parcel is going to be a negotiated item between the District and the developer and may include minimal restoration depending on timing of the plat construction.

3.2.5.3.2 Hawk Parcel

There is second growth forest on both sides of the gas main easement, with alder, fir, maple, vine maple, and understory shrubs (for reference see Figure 10, detail 4). Further west, the gravel pit is still active so alignment of the water main should be adjacent to the gas easement. The alignment enters the Lund Road ROW and follows that to the east property line before re-entering easement area and heading north along the east line of the parcel. The surface cover is forest and then wetlands associated with Jenkins Creek.

The wetland begins at the base of the slope immediately adjacent to the north edge of Lund Road and continues to a point 310 feet south of the improved road on 204th Avenue SE north of the creek. There is standing and running water throughout this area of the wetland

and many large trees. Permit agencies would look unfavorably on any proposal to clear vegetation along this alignment.

3.2.5.4 Construction Impact

3.2.5.4.1 Open Trench Construction

There are no conditions along Alternative 2 that would preclude the use of open-trench construction. There are moderately steep slopes along the south property line of the Lakeside Asphalt property, but these slopes are not steep enough to require any type of special excavation equipment. The seasonal variations in Jenkins Creek stream levels apply to Alternative 2 as well, and again, construction during the summer months to avoid trench wall instability and dewatering would be prudent.

3.2.5.4.2 Horizontal Directional Drill (HDD)

The challenges presented for HDD are the same for both Alternatives 1 and 2. Again, soils in the area have a layer open-work gravel and cobbles that make HDD risky. The opinion represented in the geotechnical briefing estimates the probability of success at 50%.

3.2.5.4.3 Easement Width

The space obtained for permanent easements is typically less than that needed during construction so the two documents have been identified separately. Permanent easements required for Alternative 2 are described earlier in the Property Acquisition section. Temporary construction permits are “easements” that expire after a specified time and are therefore not really easements. Widths vary depending on topography, planned depth of construction, need for staging areas and vehicle movement, along with other construction factors. Simple linear construction of a 16-inch transmission across a relatively flat and clear area can typically occur within a 30 foot wide permit area.

Broadleaf Parcel

A 30 foot wide temporary construction permit should suffice. More width may be necessary but seems unlikely.

Hawk Parcel

A bore pit with staging area may be required on the Hawk parcel if Jenkins Creek is not crossed by open cut methods, therefore a rectangle of approximately 40 feet by 15 feet may be required. The temporary construction permit for the main along the east side of the gas easement can likely be 30 feet wide.

3.2.6 Level of Service

The level of service outlined in TM1 can be maintained with the piping configuration proposed for Alternative 2. As with Alternative 1, the required minimum residual pressure during fire flows is the criterion most difficult to meet. In order to meet the desired level of

service, an additional section of 16-inch piping will need to be added at the north end of the alignment adjacent to the 600 zone. Opening the three check valves connecting the 600 to the 650 zone during a fire will be required to meet minimum residual pressures. The pipe flows for this configuration are presented in Figure 11. The piping configuration in this area, which is common to Alternatives 1, 2, and 4, is shown in Figure 3.

The common route will use the existing 12-inch line running along 200th Ave SE beginning at the SR 18 stub-out to the intersection with 244th St. At the intersection with 244th St. a new 16 inch line will be installed parallel to the existing 12-inch line. The new pipe will run north along 200th Ave SE, head west at SE 240th St, and end at the intersection with 196th PI SE, where it will tie into the 12-inch line connected to the 650 zone along SE 240th St. The existing 12-inch pipe adjacent to the 600 zone will be closed off from the new transmission main. Only 3 customers served on the existing 12 inch line along 200th Ave SE will be rezoned to the new 660, while the remaining 600 customers will not be rezoned. The existing customers in the 650 zone will become 660 with the new 16 inch pipeline.

3.2.7 Schedule

The anticipated schedule for Alternative 2 is identical to Alternative 1 because all of the same permits and design requirements are the same for each alternative. The schedule issues are restated below.

3.2.7.1 *Survey/Geotechnical Schedule*

Once the BODR has been completed and approved by the District and a scope and budget for design has been approved, effort on the surveying and geotechnical investigations of the selected alternative will immediately begin. The level of effort required for the geotechnical investigation will be dependent on the type of construction proposed as greater geotechnical detail is required for an HDD project.

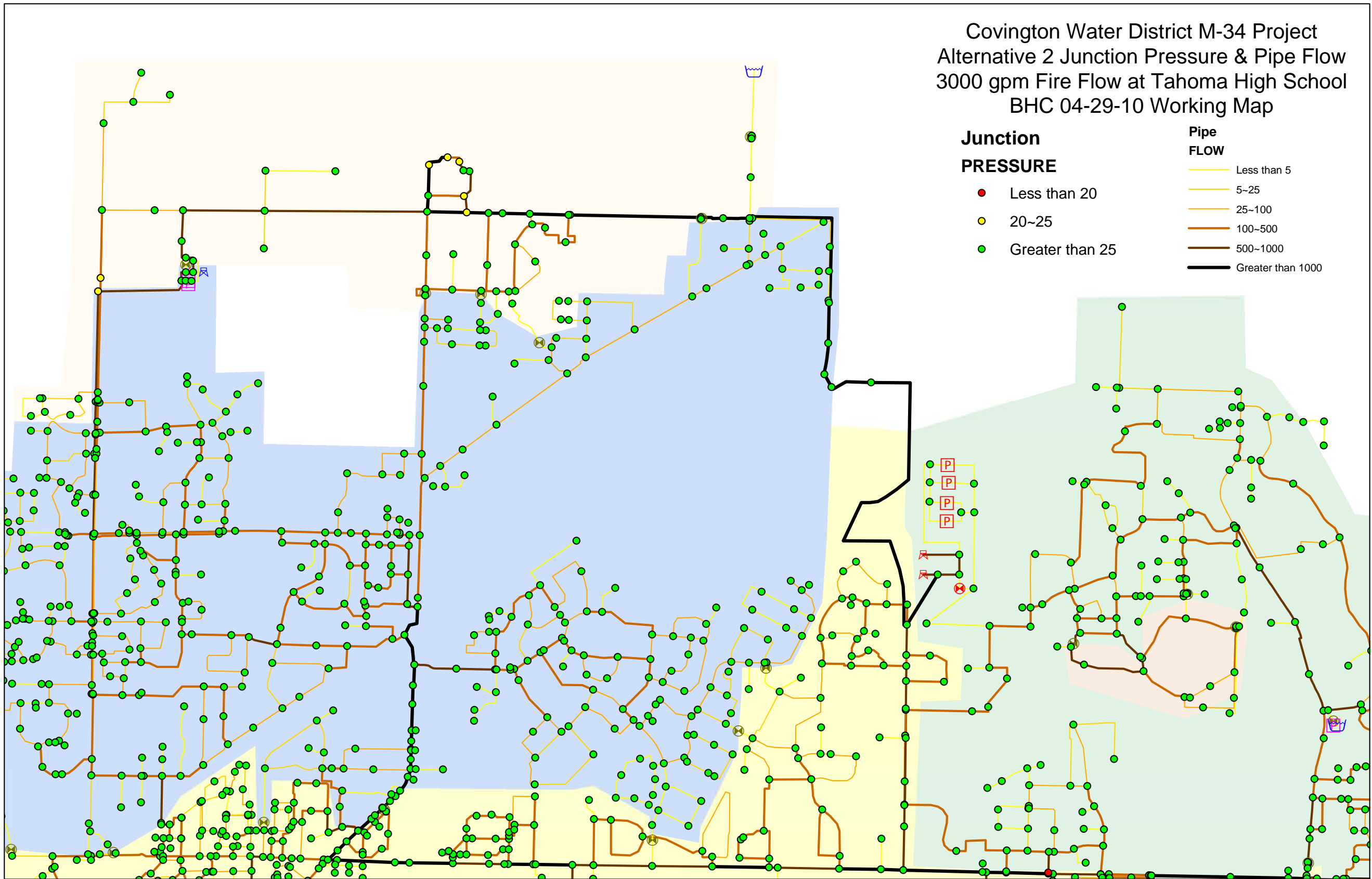
3.2.7.2 *Easement Acquisition Schedule*

The level of effort required for easement acquisition is dependent on the willingness of the property owner to work with the District. If the property owner is willing to grant an easement the entire process can be accomplished in a couple of weeks. If the property owner is not willing, it may take longer to negotiate for the easement or possibly go through the condemnation process. It is expected that the easement process could be completed in a two month time period during the design phase.

3.2.7.3 *Design Schedule*

A three step process has been identified for the design phase of the project. First, a 60% design will be submitted for review by the District. Revisions will be incorporated and refined for a 90% submittal before the Final design is submitted. A five month process for the design phase of the project is identified.

PLOTTING DATE: 5/16/2010 3:04 PM USER: Wollgorski, Erik FILE NAME: F:\0031\00001.000\ACAD\Exhibits\FINAL FIGURES\FIGURE 9.dwg



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FIGURE
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3.2.7.4 Permitting Schedule

The major factor affecting the project schedule for Alternative 2 will be the need to obtain a Corps of Engineers permit for the crossing of Jenkins creek. It is likely that a Corps permit will be required whether the line is constructed using open trench construction or by horizontal directional drilling. It is possible that it will take less time to obtain the permit if the line is constructed using HDD. In an attempt to reduce the overall project schedule, it is recommended that permits are submitted based on the 60% design. Based on an estimate of 6 to 9 months to acquire a Corps permit, a 7 month permit process is shown. This will be more than enough time to acquire the additional permits required beyond the Corps permit.

3.2.7.5 Construction Schedule

Ideally, this project should be constructed in the summer when the water in Jenkins Creek and associated tributary's are at their lowest. Based on a 2009 site visit, there is evidence that the water in Jenkins Creek dries up in the summer although it is not known at what depth the groundwater shows up. Table 12 summarizes the anticipated time for each of the items listed above along with a proposed construction schedule showing the construction in the wetland occurring in the summer months.

Table 12 Alternative 2 Schedule Alternatives Analysis Covington Water District	
	2010
	J J A S O N D J F M A M J J A S O N D
Design	
Predesign	
Survey/Geotech	
Final Design	
Easement Acquisition	
Permitting	
Construction	
Transmission Main Online	

3.2.8 Cost

3.2.8.1 Wetland Mitigation

Assumptions for the basis of cost for Alternative 2 wetland mitigation are the same as those outline for Alternative 1. The general estimated cost for restoration only is \$124,000. For restoration plus 4:1 wetland mitigation the cost ranges is estimated at \$380,000 to \$440,000.

3.2.8.2 Easement Valuation Formula

The easement valuation formula is described earlier in this report.

3.2.8.2.1 Time Assumed for Temporary Construction Permit Valuation

This alignment assumes typical open-cut trench construction for the majority of the construction. With typical production rates of approximately 200 feet per day, including final surface restoration, construction time is expected to run for approximately 4 months. The method selected for crossing Jenkins Creek poses a potential for slower per-day production in this limited area. The time for each parcel is included in the individual parcel calculation.

3.2.8.2.2 Easement and Permit Values

This alignment requires easements and temporary construction permits from the following land owners, with the fees calculated and shown per the standard formulas (Table 13). These calculations are based on preliminary easement sizing, which would change slightly during final design. It is not recommended paying ECL Investors for an easement but instead coordinating construction of the main as part of the plat development. For the Hawk easement, the fee value was reduced to a 0.1 multiplier due to the severely limited potential use of this area by the owner.

Table 13 Easement and Permit Values - Alternative 2 Alternatives Analysis Covington Water District					
Parcel Number	Owner	Easement Size (ft²)	Easement Fee (\$)	Temp. Permit Size (ft²)	Temp. Permit Fee (\$)
776040-1070	ECL Investors, LLC	10,670	\$8,815 ⁽¹⁾	32,010	\$4,231 ⁽¹⁾
292206-9012	Jim Hawk	15,500	\$980	46,500	\$1,176
Totals			\$9,795		\$5,407
Notes:					
(1) It is not recommended paying ECL Investors for an easement but instead coordinating construction of the main as part of the plat development.					

3.2.8.3 Infrastructure Improvements

The infrastructure improvement costs have been broken into several areas depending on the type of construction being proposed. Costs have been estimated depending on whether the proposed 16-inch transmission main is being constructed in an existing ROW, easement, wetland buffer, the wetland itself, or down a steep slope. The costs include construction of the proposed improvements from the Tank 2 site through the crossing of SR 18 and all the way to the intertie at SE 240th Street and 196th Avenue SE. Table 14 summarizes the location of the proposed construction including lengths and the estimated cost for the infrastructure improvements for Alternative 2.

Table 14 Infrastructure Improvements - Alternative 2 Open Trench Alternatives Analysis Covington Water District					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	16-inch DI Water in ROW	2,740	LF	\$175	\$479,500
2	16-inch DI Water in Easement	1,880	LF	\$150	\$282,000
3	16-inch DI Water in Wetland Buffer	615	LF	\$175	\$107,625
4	16-inch DI Water in Wetland Open Trench on Piles	640	LF	\$1,050	\$672,000
5	16-inch DI Water on Steep Slope	380	LF	\$500	\$190,000
6	Gas Main Crossing	1	LS	\$25,000	\$25,000
7	16-inch DI Water in ROW (north of SR 18)	2,700	LF	\$175	\$472,500
				Subtotal	\$2,228,625
				Tax (8.6%)	\$191,622
				TOTAL	\$2,420,247

In an attempt to compare open trench construction with the construction of the proposed line using a trenchless technology such as horizontal directional drilling, a second cost estimate is for Alternative 2 using HDD. It should be noted that this is a very rough estimation of potential costs and should not be used in determining the recommended alternative. It is recommended that the potential use of HDD be reviewed and analyzed further during the design phase of the project if a pipeline construction alternative is selected. The recommendation is based on the amount of potential risk involved with this type of construction and the need for extensive geotechnical investigations. While cost of the infrastructure improvements may be higher for a HDD project, it has the potential to reduce the wetland mitigation costs and the length of time required for permitting. Table 15 summarizes the estimated costs associated with HDD construction.

3.2.8.4 Summary

Table 16 summarizes all of the anticipated costs associated with Alternative 2. The table includes costs for permit fees, wetland mitigation, engineering (design, permitting, and construction), easement costs, and construction costs. The engineering costs are based on 25% of the anticipated construction cost without sales tax and the District legal and administration costs are 7% of the construction cost without sales tax. A 20 percent contingency factor is included to account for additional project uncertainties.

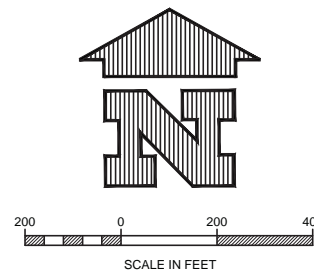
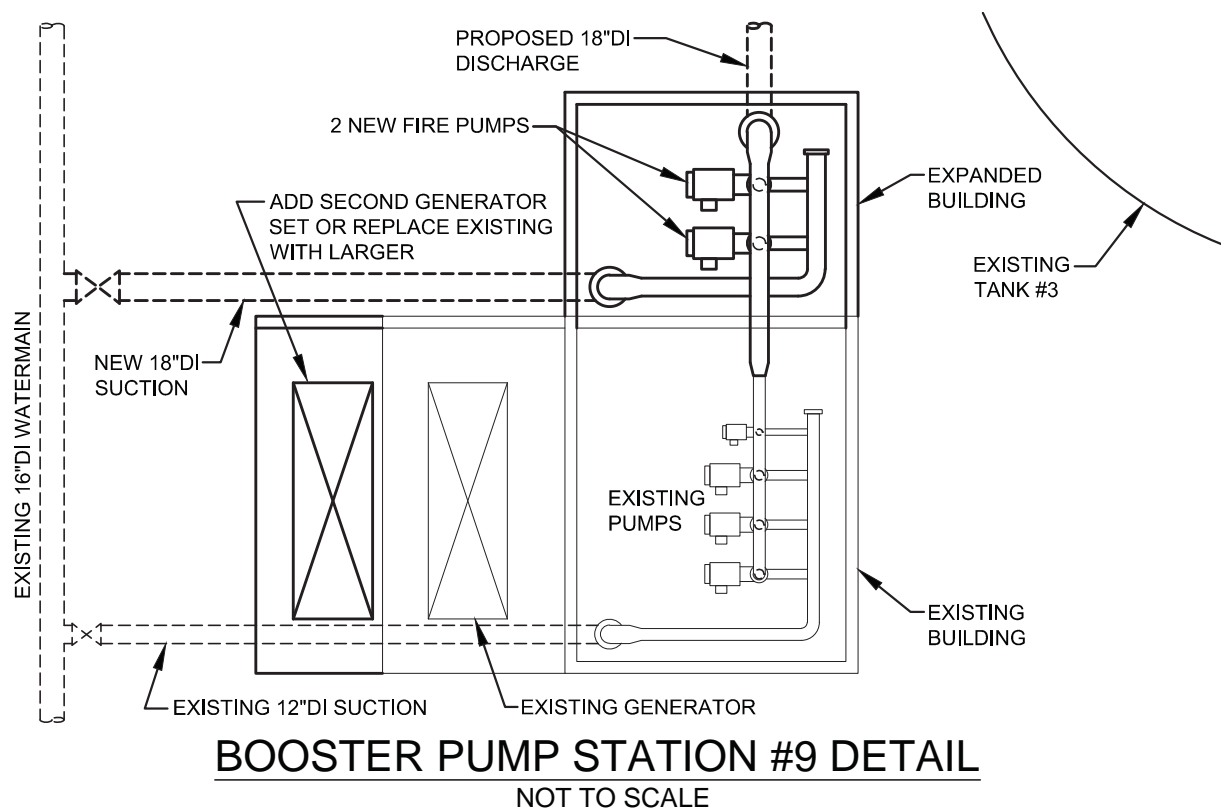
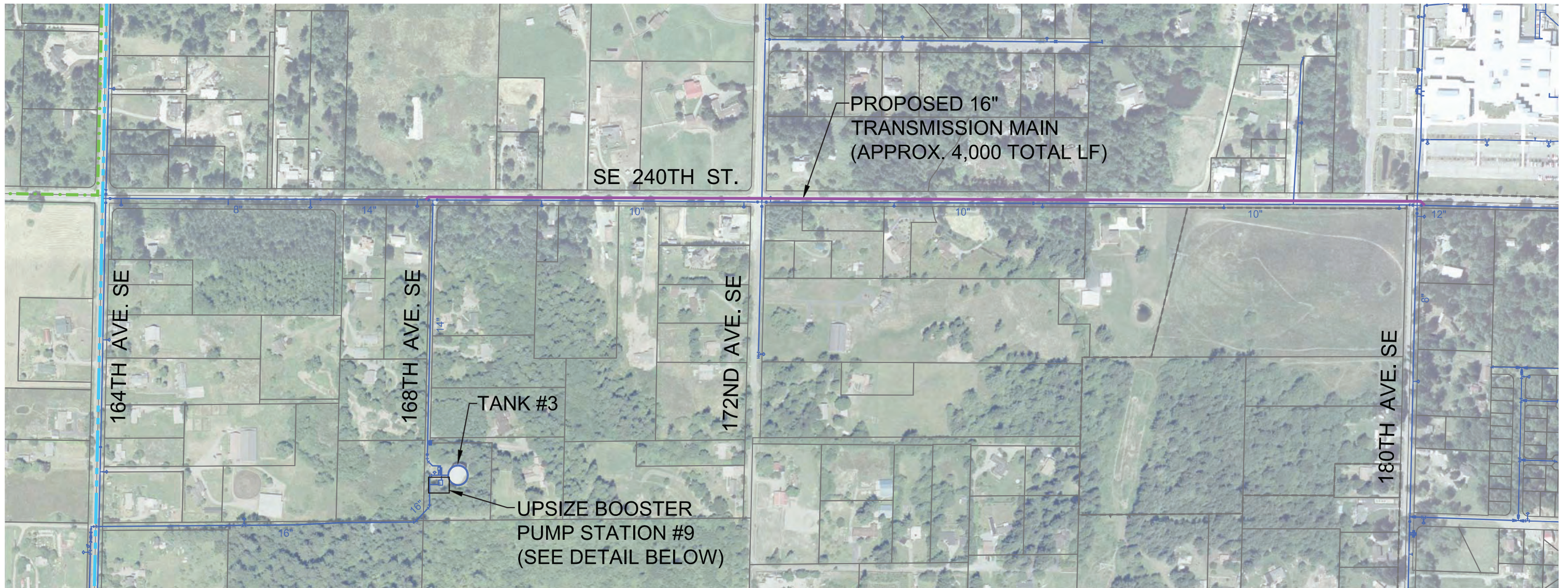
Table 15 Infrastructure Improvements - Alternative 2 HDD Alternatives Analysis Covington Water District					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	16-inch DI Water in ROW	2,740	LF	\$175	\$479,500
2	16-inch DI Water in Easement	1,880	LF	\$150	\$282,000
3	16-inch DI Water in Wetland Buffer Directional Drill	615	LF	\$800	\$492,000
4	16-inch DI Water in Wetland Directional Drill	640	LF	\$800	\$512,000
5	16-inch DI Water on Steep Slope	380	LF	\$500	\$190,000
6	Gas Main Crossing	1	LS	\$25,000	\$25,000
7	16-inch DI Water in ROW (north of SR 18)	2,700	LF	\$175	\$472,500
				Subtotal	\$2,453,000
				Tax (8.6%)	\$210,958
				TOTAL	\$2,663,958

Table 16 Total Project Cost - Alternative 2 Alternatives Analysis Covington Water District		
Description	Costs for Open Trench Construction	Costs for HDD Construction
Construction Cost w/WSST	\$2,420,247	\$2,663,958
Engineering (Design, Permitting & Construction)	\$557,156	\$613,250
Permit Fees	\$9,700	\$9,700
Easement Costs/Temporary Construction Permits	\$15,200	\$15,200
District Legal & Administration	\$156,004	\$171,710
Wetland Restoration & Mitigation	\$440,000	\$0
Subtotal	\$3,598,307	\$3,473,818
Contingency (20% rounded)	\$720,000	\$695,000
TOTAL	\$4,318,307	\$4,168,818

3.3 Alternative 3

An aerial view of the proposed transmission main route unique to Alternative 1 is presented in Figure 9. A close-up of the piping modifications common to Alternatives 1, 2, and 4, and adjacent to the 600 zone, is presented in Figure 12.

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LEGEND

- COVINGTON CITY LIMITS
- COORDINATED WATER SYSTEM PLAN (CWSP) SERVICE AREA
- CWD CORPORATE BOUNDARY
- EXISTING WATERMAIN
- PROPOSED WATERMAIN

COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVE 3 UPSIZE BOOSTER STATION #9

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FIGURE
NO.
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3.3.1 Environmental Impact

There will be minimal environmental impacts associated with Alternative 3. The pump station expansion will occur on District owned property and will not require any additional land for the new pump station. The proposed piping improvements will be constructed within the existing road prism of SE 240 Street.

3.3.2 Property Acquisition

3.3.2.1 *Easement Requirements*

This alternative will construct improvements entirely within District property and public ROW so easements are not required. The Contractor may need to acquire temporary staging areas but the District does not necessarily need to acquire these ahead of time.

3.3.2.2 *Right of Way*

This alternative lies within King County jurisdiction from the existing tank/pump station site to the centerline of 180th Avenue SE, where it enters City of Covington jurisdiction. SE 240th Street lies within City of Covington jurisdiction to the east margin of 196th Avenue SE, where it re-enters King County jurisdiction.

168th Avenue SE is a small private road leading to several homes and the District's reservoir and pump station site. A small stream crosses under this road near SE 240th Street. The new main will need to cross over the stream but that should not pose a problem. Temporary impacts to the neighbors pose the greatest issue on this road.

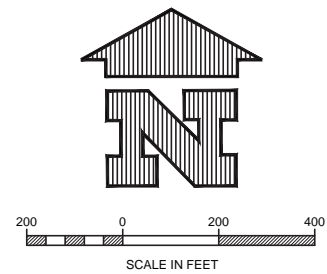
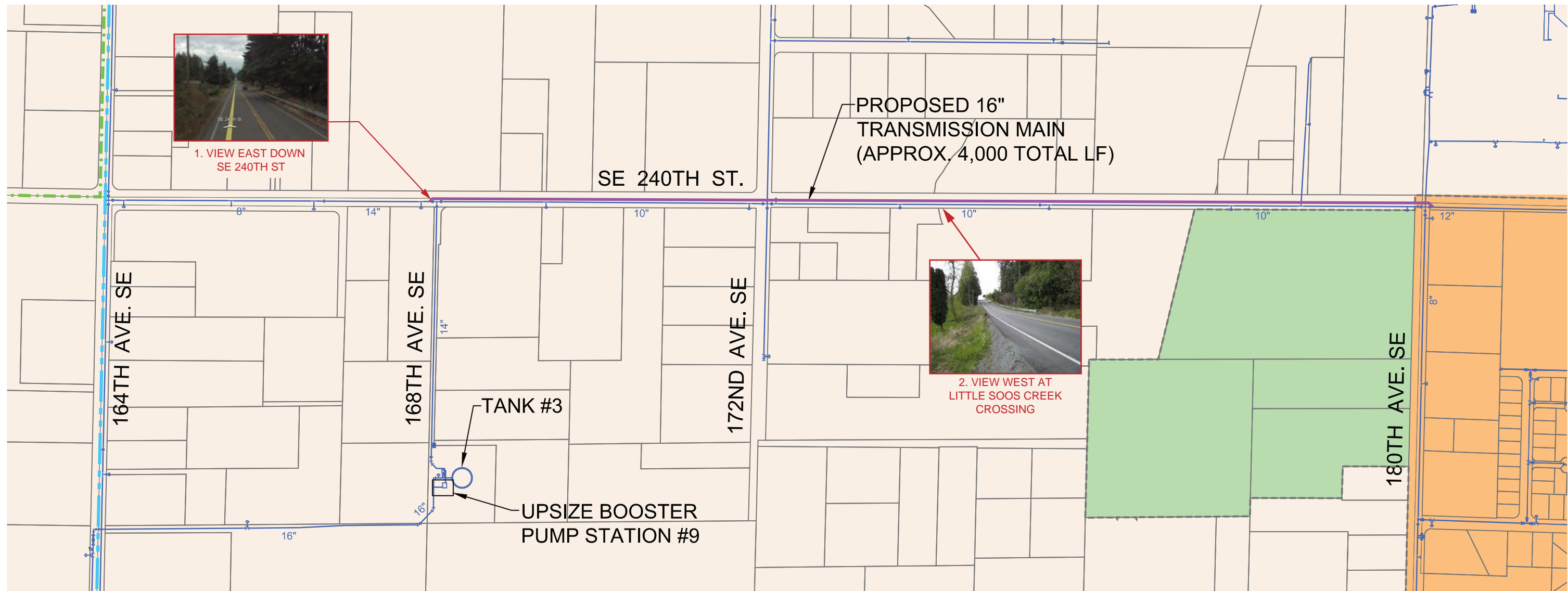
SE 240th Street is a busy arterial with heavy traffic in a fairly narrow roadway. It is a two-lane road with gravel shoulders. The road surface is in excellent condition with a full-width asphalt overlay sometime in the last 2 – 3 years. Any cutting of this road inside the fogline will require a full-width overlay. A large pipe is likely to lead to this requirement. The location of the high school and the fact this road provides a crossing under SR 18 into Maple Valley mean this road will be heavily travelled throughout the day and traffic control will be a major concern.

Detour options are poor, with through streets on approximately a one mile grid. Closing even one lane of this road would have major traffic impacts. Night work would help reduce the traffic impact and may be required by the two ~~road~~ jurisdictions.

3.3.2.2.1 Other Utilities in ROW

Aerial utilities are located on both the north and south sides of SE 240th Street. The road shoulders vary in width and function, with ditches in some sections. King County considers ditches to be functional parts of the drainage utility and discourages utility construction in ditches or in the shoulder adjacent to ditches. In some areas the shoulder narrows considerably and there are guard rails above slopes (Figure 13, detail 1).

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LEGEND

- COVINGTON CITY LIMITS
- COORDINATED WATER SYSTEM PLAN (CWSP) SERVICE AREA
- CWD CORPORATE BOUNDARY
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- King County - Rural Res.
- Covington - Med. Density Res.
- Covington - Parks

COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVE 3 DETAIL MAP

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FIGURE
NO.
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The most significant restriction along this roadway is the crossing of Little Soos Creek at approximately 174th Avenue SE (Figure 13, detail 2). The shoulders narrow to nearly nothing and the road drops off steeply on both sides. The pipe would have to cross over the stream culvert to avoid a very deep and expensive crossing under the creek.

3.3.3 **Permitting**

In addition to ROW permits from King County and the City of Covington, Washington Department of Fish and Wildlife Hydraulic Project Approval (HPA) permits will likely be required for the stream crossings on both 168th Avenue SE and SE 240th Street, although neither is likely to be difficult or include significant restrictions because the proposed construction is unlikely to have any effect on the streams.

3.3.3.1 **SEPA**

The pipe size and alignment through critical areas will require preparation of a SEPA Environmental Checklist and a SEPA Determination by the District. This is a typical process and no special concerns are anticipated with the SEPA process.

3.3.3.2 **Permit Type, Fee, Effort to Prepare, and Schedule**

Anticipated permits are shown in Table 17. ROW permits typically have fixed fees, while some permit fees, such as those for grading permits, vary as a result of impacted area. Other permits have no submittal fee.

Table 17 Permitting Requirements – Alternative 3 Alternatives Analysis Covington Water District					
Agency	Permit Type	Permit Fee	Effort to Prepare	Schedule	Notes
City of Covington	ROW	\$300 - City usually bills utilities directly	Easy	3 weeks	Traffic Control Plan required with permit submittal
King County	ROW	\$300 - City usually bills utilities directly	Easy	3 weeks	Traffic control will be a major concern
WDFW	HPA	none	Easy	2 months	Restrictions unlikely
King County	Building permit	up to \$15,000 – based on project value and anything they can squeeze out of you	Unnecessarily difficult	6 months	Pre-submittal conference helps considerably in easing this process

3.3.3.3 *Schedule Implications*

The primary potential for delay lies with King County building permitting and their history of noncommittal communication and changing requirements. The actual submittal requirements are relatively clear but individual reviewers often interpret these in different ways. A pre-submittal conference at King County DDES will help clarify requirements. Starting this early in the process will allow for significant overlap in the design and permitting schedules to keep the project on the original schedule.

3.3.4 Operations & Maintenance

The operation and maintenance of Alternative 3 will not increase over what is currently being done by the District. The District already maintains the existing pumps in the pump station. This alternative would replace the pumps with ones that can provide the fire flow to the 650 zone. Likewise, the District already maintains the existing 10-inch diameter water line in SE 240th Street. This alternative would only replace that existing 10-inch diameter water line with a 16-inch water line.

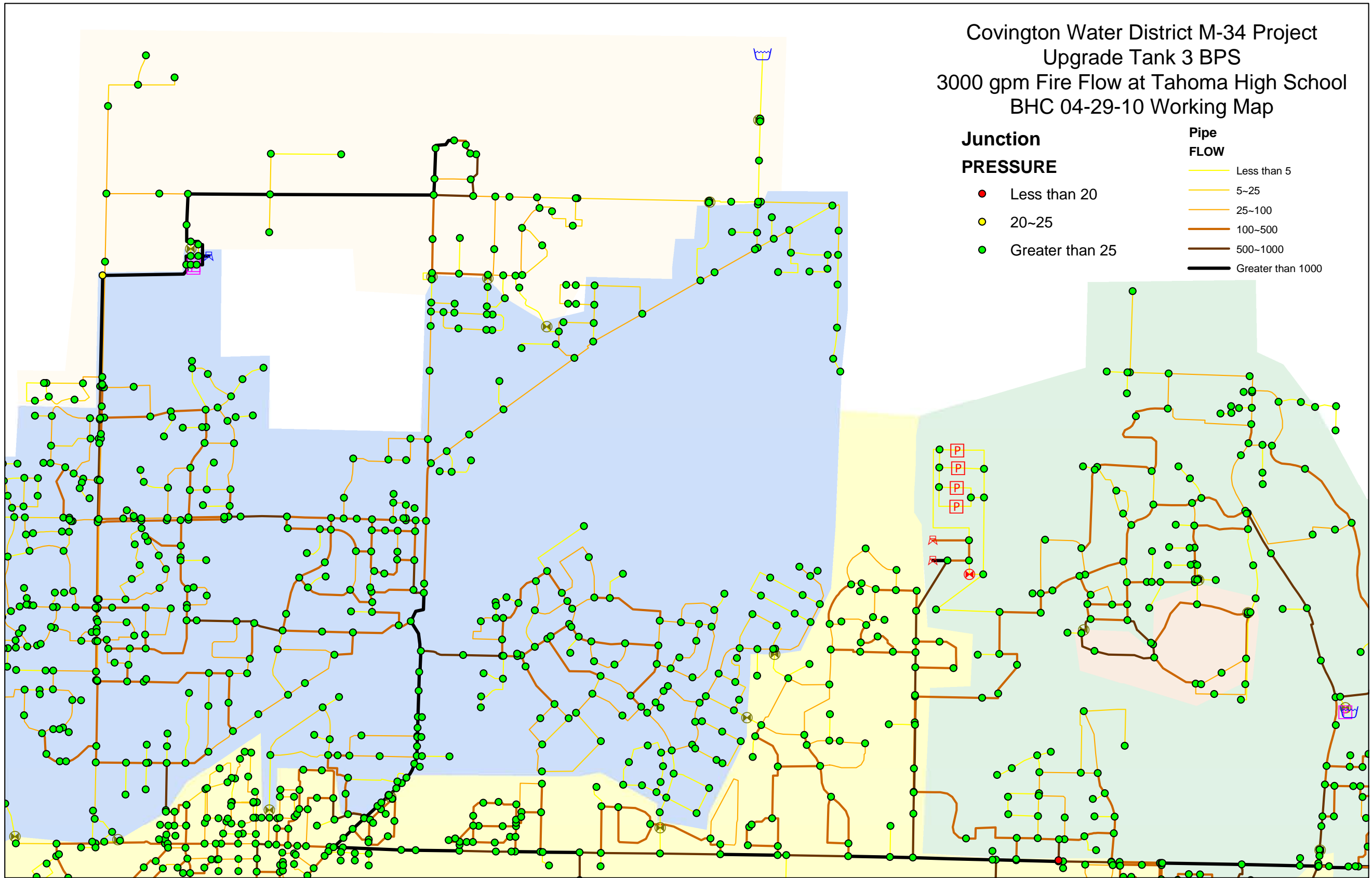
3.3.5 Constructability/Risk

Constructability of the proposed improvements required for Alternative 3 is relatively easy. There is adequate access and room for construction of the new pump station expansion at the Tank 3 site. The only risk for construction of Alternative 3 will be the construction of the new 16-inch diameter transmission line in SE 240th Street, specifically at the creek crossing. SE 240th Street dips between where the existing line from the pump station ties into SE 240th Street and the end of the proposed improvements at 180th Avenue SE. There is an existing creek crossing in a culvert at the low point. The District has attempted to replace the existing water line in the past and has had opposition to disturbing the existing culvert. It is possible that the creek crossing could be constructed using a trenchless technology, such as bore and jack, but it would require additional study during the design phase if this alternative is selected.

3.3.6 Level of Service

Meeting the District's level of service criteria in the 650 zone will require upsizing the Tank 3 BPS to 3,200 gpm at 40-feet TDH. In addition, excessive velocity in the 10-inch line in SE 240th St requires increasing the line size to 16-inch (velocities are still greater than 8 ft/s using a 12-inch line). Figure 14 illustrates pipe flow and residual pressures for this scenario. Unlike Alternative 2, the check valves are not required to open to meet residual pressure requirements.

PLOTTING DATE: 5/16/2010 3:04 PM USER: Wollgorski, Erik FILE NAME: F:\0031\00001.000\ACAD\Exhibits\FINAL FIGURES\FIGURE 9.dwg



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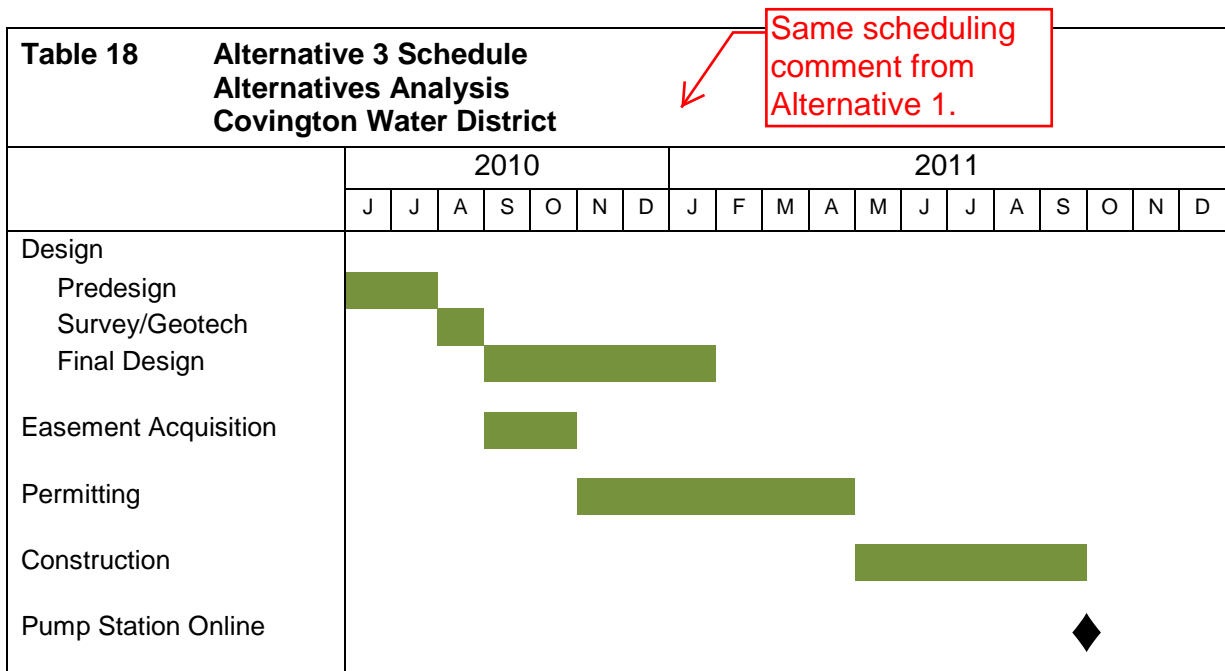
FIGURE
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The existing pump station was also modeled to see if the current pumping configuration would be able to meet the old commercial fire flow criteria of 2,000 gpm for 2 hours. The model results indicate the existing BPS may just barely have the capacity to supply 2,000 gpm and meet residual pressure requirements. The manufacturer's pump curves are in the modeled pump station, however the results are so close to meeting the requirement that it may come down to pump station losses or impeller wear. The check valves open to provide additional flow for this scenario.

3.3.7 Schedule

While this alternative would not require a Corps of engineers permit like Alternatives 1 and 2, Alternative 3 would require a King County Building permit for the expansion of the existing pump station. Based on past experience, obtaining a King County Building permit can take as long as getting a Corps permit. It is possible that it will take less time to obtain the permit since the existing structure will be expanded and not a new one. Similar to a Corps permit, and in an attempt to reduce the overall project schedule, it is recommended that permits are submitted based on the 60% design. The 60% design should be completed in early November 2010, at which time the permits should be submitted. Based on an estimate of 6 months to acquire a King County building permit, the final design will be completed around May of 2011 so that the project can be bid once permits have been obtained. Table 18 shows the Alternative 3 schedule.



3.3.8 Cost

3.3.8.1 *Infrastructure Improvements*

Table 19 summarizes the estimated cost for the infrastructure improvements for Alternative 3.

Table 19 Infrastructure Improvements - Alternative 3 Alternatives Analysis Covington Water District					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	16-inch DI Water in ROW	3,920	LF	\$175	\$686,000
2	Site Piping	1	LS	\$25,000	\$25,000
3	Expand Building	1	LS	\$60,000	\$60,000
4	Pumps and Equipment	1	LS	\$45,000	\$45,000
5	Electrical Equipment	1	LS	\$80,000	\$80,000
6	Telemetry /Programming/ Controls	1	LS	\$10,000	\$10,000
7	Generator Set	1	EA	\$60,000	\$60,000
8	Site Improvements	1	LS	\$25,000	\$25,000
				Subtotal	\$991,000
				Tax (8.6%)	\$85,226
				TOTAL	\$1,076,226

3.3.8.2 Summary

Table 20 summarizes all of the anticipated costs associated with Alternative 3. The table includes costs for permit fees, engineering (design, permitting, and construction), District legal and administration, and construction costs. The engineering costs are based on a percentage of the anticipated construction cost. For the design of a building expansion, a percentage of 30% for engineering was applied and the same 7% for District legal and administration. A 20% contingency factor is applied to account for additional project uncertainties.

Table 20 Total Project Cost - Alternative 3 Alternatives Analysis Covington Water District	
Description	Costs for Construction
Construction Cost w/WSST	\$1,076,226
Engineering (Design, Permitting & Construction)	\$297,300
Permit Fees	\$21,000
Easement Costs/Temporary Construction Permits	\$0
District Legal & Administration	\$69,370
Wetland Restoration & Mitigation	\$0
Subtotal	\$1,463,896
Contingency (20% rounded)	\$293,000
TOTAL	\$1,756,896

3.4 Alternative 4

Alternative 4 was added to this evaluation by the consulting team after the initial geotechnical and environmental impacts had been completed. A separate site visit was conducted on June, 2010 to adequately describe the alternative. An aerial view of the proposed transmission main route unique to Alternative 4 is presented in Figure 15. A close-up of the piping modifications common to Alternatives 1, 2, and 4, and adjacent to the 600 zone, is presented in Figure 3.

3.4.1 Environmental Impact

3.4.1.1 *Covington Streams and Wetlands*

Alternative 4 will pass through a tributary to Jenkins Creek and an associated wetland midway along the alignment. The stream is likely a fish bearing stream (Type F stream), since no fish barrier between the tributary and Jenkins Creek is known. Although the area alignment passes through is not officially designated a wetland on the National Wetland Inventory Map, it was clear from walking the site the area would be classified as a wetland when examined for permitting. The wetland is likely an extension of the Category I wetland identified and discussed in the Alternative 1 section.

3.4.1.1.1 Impacts

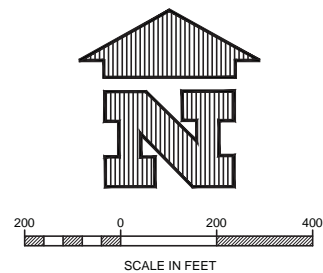
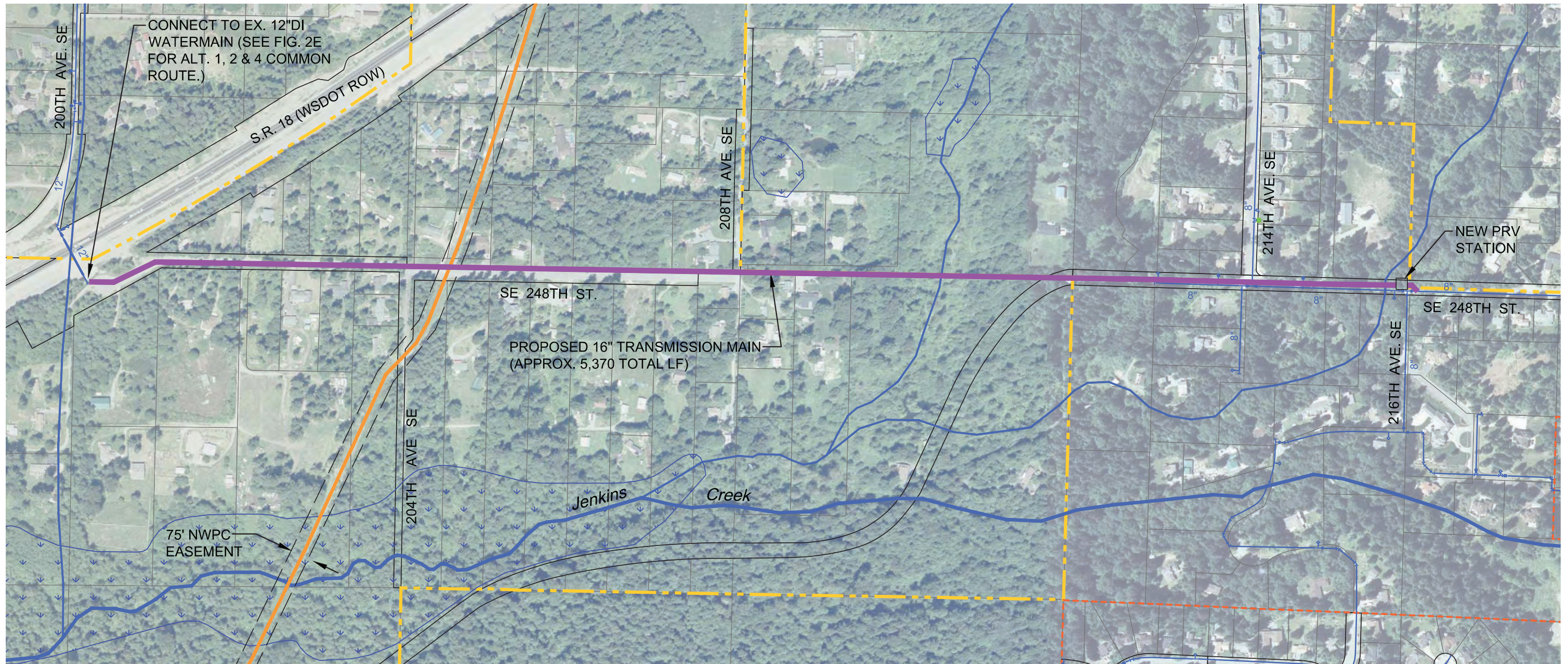
Approximate impact quantities for Alternative 4 are summarized in Table 20. The impact quantities were based on a 30-foot-wide area for clearing and grading along the route alternatives. These estimated impact quantities do not include any additional impacts that may occur associated with construction access or staging areas. As with Alternative 1, if directional drilling is determined to be a viable option, it is possible that wetland, stream, and buffer impacts may be avoided.

Table 20 Estimated Wetland, Stream, and Buffer Impacts – Alternative 4 Alternatives Analysis Covington Water District			
Alternative	Wetland Impact (square feet)	Stream Impacts (square feet)	Buffer Impacts (square feet)
Alternative 1	21,500	300	7,500

3.4.1.1.2 Mitigation

Mitigation requirements will be nearly identical for Alternative 1. See Section 3.1.1.2.1 for a detailed description of requirements.

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LEGEND

- PROPOSED WATERMAIN
- GAS PIPELINE
- CWD CORPORATE BOUNDARY
- 8" EXISTING WATERMAIN & SIZE
- MAPLE VALLEY CITY LIMITS
- APPROXIMATE WETLAND BOUNDARY

COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVE 4

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FIGURE
NO.
15

3.4.2 Property Acquisition

3.4.2.1 *Current Property Owners*

This alignment minimizes the number of required easements, while maximizing use of platted ROW. The alignment can potentially be built on as few as two parcels.

3.4.2.1.1 Timothy and Donna Bartholomew (parcel # 202206-9038)

This property is located at the end of the gravel road extension of SE 248th Street and provides the majority of the easement that would be necessary. SE 248th Street is public ROW to the edge of this parcel. This parcel extends nearly all the way west to 208th Avenue SE, with much of this within a 30-foot-wide panhandle. This panhandle includes a developed driveway that appears to serve the Warnat parcel.

The Bartholomew parcel is clear and open for approximately the easterly 200 feet, although this appears to be imported fill bordered by a pond constructed since the 2007 King County aerial photos were taken. There were ducks swimming in this pond at the time the site visit and the south edge of this parcel was inundated with standing water extending onto the City of Covington parcel (Cedar Creek Park) to the south of the Bartholomew parcel. There is running and standing water on both sides of SE 248th Street from about 213th Avenue west to the Bartholomew parcel.

The westerly approximately 315 feet of the Bartholomew parcel is used as a driveway which appears to serve the Warnat parcel.

3.4.2.1.2 Stanley Bales (parcel # 202206-9023)

An interesting property anomaly is the ownership of the Bales parcel (see Figure 16) which was originally larger and has been divided over time. Visualize extending the purple boundary lines shown in Figure 16 to a single rectangular parcel to identify the original shape. Where other properties have had to dedicate ROW, this parcel has not, so the small square by itself is still actually part of the larger parcel.



Figure 16 Bales Parcel

3.4.2.1.3 Diane Willis (parcel # 202206-9016)

The paved road within the boundary of the Willis parcel is shown by the purple parcel outlined in Figure 17. The road continues across the parcel even though the platted right of way ends. This pavement across the Willis parcel provides access to 208th Avenue SE and several homes in this area. The legal description for this parcel says “less state highway” and SE 248th Street was originally a state highway. The Assessor’s Map does not depict this exclusion but it is likely this portion of the road is actually public ROW.

3.4.2.2 Easements

The Bartholomew parcel contains a well covenant for the private well located near the pond near the south edge of the property but transmission main construction should have no effect on this well or be restrained by the covenant.

The westerly 660 feet of the south 30 feet of Bartholomew’s parcel is covered by an easement, likely for ingress, egress, and utilities. The easement was not obtained on the King County Recorder’s Office website and requires further investigation should this alignment be preferred.



Figure 17 Willis Parcel

3.4.2.2.1 Restrictions

Crossing the stream on the Bartholomew parcel will require easements, closer examination of the vegetation and soil conditions, as well as the stream itself. Timing restrictions limiting construction to dry summer weather are likely. King County will be interested in maintaining access to the Warnat parcel during any construction on their driveway, particularly for fire protection.

3.4.2.2.2 Requirements

Easements may vary in width, clearing and restoration requirements, and length of time required for construction within the easement and the temporary construction permit area depending on surface conditions, topography, planned type of construction, and proximity of improvements.

Permanent easements for the constructed transmission main can likely be limited to 10 feet in width in all areas. Because these easements restrict surface uses, they are most often placed in areas where other uses are either already restricted or unlikely, such as along property lines.

3.4.2.3 Right of Way

There are two separate ROW jurisdictions associated with this alignment.

1. King County governs the semi-improved Lund Road and also SE 248th Street including where it turns to the south at the west end.
2. WSDOT for the SR 18 crossing.

ROW locations and widths are shown earlier in Figure 6.

3.4.2.3.1 Conditions and Restoration

The ROW of SE 248th is asphalt pavement from 216th Avenue SE to 214th Avenue SE at which point it turns to a narrow gravel road to the east edge of the Bartholomew parcel. The road is narrow and there is a stream on the north side. A parallel stream crosses under 216th Avenue SE on the south side SE 248th Street and enters the front yard on the southwest corner of the intersection. The valve cluster is north of this culvert so we would avoid crossing this stream. Full-width pavement replacement will be required from 216th Avenue SE to 214th Avenue SE. SE 248th Street becomes a gravel road at 214th Avenue SE and is the only access for parcels down this road (Figure 18, detail 1).

From 208th Avenue SE west to SR 18 the road is wide and the asphalt pavement is in good condition. There are shallow ditches on both shoulders (Figure 18, detail 2). West of SR 18, King County iMap indicates the presence of a stream along the edge of 200th Avenue SE and the north side of SE 240th Street. iMap also shows an intermittent stream running south to the west of 200th Avenue SE.

However, closer examination of the available data, as well as a site visit (Figure 18, detail 3), indicate that there is no stream of concern from a permitting or sensitive areas point of view. They may be referencing the very shallow roadside swale, which would be outside of our construction area.

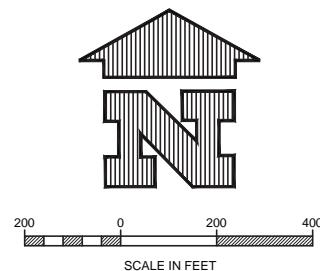
The primary issues with this alignment for permitting are crossing the small intermittent branch of Jenkins Creek, road surface restoration throughout the alignment, and revising the WSDOT franchise for the SR 18 crossing.

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LEGEND

	PROPOSED WATERMAIN
	GAS PIPELINE
	CWD CORPORATE BOUNDARY
	EXISTING WATERMAIN & SIZE
	MAPLE VALLEY CITY LIMITS
	KING COUNTY - RURAL RES.
	KING COUNTY - MINING
	KING COUNTY PARKS
	APPROXIMATE WETLAND BOUNDARY



COVINGTON WATER DISTRICT

M-34 TRANSMISSION MAIN ALTERNATIVE 4 DETAIL MAP

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FIGURE
NO.

18

3.4.3 Permitting

The following section describes anticipated permitting requirements for this alignment. The project lies within two land use jurisdictions and two ROW jurisdictions.

3.4.3.1 **SEPA**

The pipe size and alignment through critical areas will require preparation of a SEPA Environmental Checklist and a SEPA Determination by the District. This is a typical process and no special concerns are anticipated.

3.4.3.2 **Permit Type, Fee, Effort to Prepare, and Schedule**

Anticipated permits are shown in Table 21. ROW permits typically have fixed fees, while some permit fees, such as those for grading permits, vary as a result of impacted area. Other permits have no submittal fee.

Table 21 Permitting Requirements – Alternative 4 Alternatives Analysis Covington Water District					
Agency	Permit Type	Permit Fee	Effort to Prepare	Schedule	Notes
King County	Right of way	\$600 – for two separate permit areas - County usually bills utilities directly	Easy	3 weeks	
King County	Clearing and grading permit	Approx. \$3500	Moderate	1-2 months	Based on clearing 30' wide and trench 4' deep and 4' wide with 5 hrs of DDES field inspection
Washington Department of Fish and Wildlife	Hydraulic Project Approval	None	Moderate	1-2 months	Could be a fish window limiting work to dry conditions
US Army Corps of Engineers	Nationwide Permit 12 for Utility Line Activities	None	Moderate	6-9 months	Federal nexus means delay due to ESA Section 7 consultation
Department of Ecology	Federal Permit 401 for wetland mitigation	None	Moderate to difficult due to quality of wetland	Issued concurrently with Corps Permit 12	Can be issued up to 180 days after Permit 12, but usually issued concurrently

3.4.3.3 **Supporting Studies Required**

Work within critical areas is likely to require specific critical areas studies, including wetlands/streams and geological studies. These specialties are already included on the project team and will be tasked with preparing supporting studies. Studies will include Critical Areas Reports for Geotechnical and Environmental aspects, as well as a Biological Evaluation to support wetland and stream crossing.

3.4.3.4 Permit Conditions

Permit conditions are either prescriptive or applied by the permit reviewer, or both. Conditions usually refer to construction timing to reduce traffic or environmental impacts, or to restoration requirements. We do not anticipate any unusual permit conditions. The conditions expected include:

- Schedule restrictions on the Jenkins Creek crossing
- Dewatering water quality monitoring requirements
- Flagging or fencing of clearing limits
- Asphalt restoration within roadways
- Surface restoration outside of roadways including location-specific hydroseeding and buffer restoration planting
- 3 to 5 years of restoration planting survival monitoring and removal of invasive species in restoration area

Operations and Maintenance

Similar to Alternative 1 and 2, the majority of the Alternative 4 alignment will be located in or near improved ROW or access easements for ease of operation and maintenance. The eastern portion of Alternative 2, as shown in Figure 15, can be accessed from Witte Road along SE 248th Street, which is paved until it reaches the exiting forested area.

Once the line within the forested area reaches the existing wetland, it will be very difficult to access and maintain if required.

The western portion of Alignment 4 between the existing wetland and the crossing of SR 18 can be accessed from 208th Avenue SE. While part of the paved surface of SE 248th Street is narrow, it would be easy to maintain the proposed water line from this point to the SR 18 crossing. The District will also have to maintain a new PRV vault required to step down the pressure between the 770 and 650 zones.

3.4.4 Constructability/Risk

The subsurface conditions related to construction of the pipeline are relatively simple and straightforward from the eastern end of the alignment at 216th Avenue SE westward about 1,300 feet to the end of paved SE 248th Street. The eastern half of this segment is a terrace comprised of coarse glacial outwash that is about 17 feet higher than the Jenkins Creek tributary plain. This portion of the alignment is likely to be above the water table for the proposed water pipeline excavation. When the alignment drops down to the level of the Jenkins Creek tributary, the groundwater level is at or very near the ground surface. For the remainder of the alignment westward, the upper few feet is silty fine sand and fine sandy silt. Below that, the subsurface conditions are likely to be similar to those described above

in the Lakeside Gravel Pit (Section 3.1.5.1). The impact of those geologic conditions on construction on this alignment is likely to be similar to those described in Section 3.1.5.3.2, as the two areas are about a mile apart and the geologic formation is mapped as the same.

3.4.5 Level of Service

The level of service outlined in TM1 can be maintained with the piping configuration proposed for Alternative 4. As with the previous alternatives, the required minimum residual pressure during fire flows is the criterion most difficult to meet. In order to meet the desired level of service, the same additional section of 16-inch piping described in detail for Alternative 2 will need to be added at the north end of the alignment adjacent to the 600 zone (for reference see Figure 3). In addition, upsizing some of the existing 770 piping on the east side of the transmission main is required. A PRV valve will be required to step the service down from 770 to the desired 650 HGL. This prevents any customers aside from the 3 customers affected by the piping change on 200th Ave SE from being affected by a rezone. The pipe flows for this configuration are presented in Figure 19.

3.4.6 Schedule

The anticipated schedule for Alternative 4 is identical to Alternative 1 and 2 because all of the same permits and design requirements are the same for each alternative. The schedule issues are restated below.

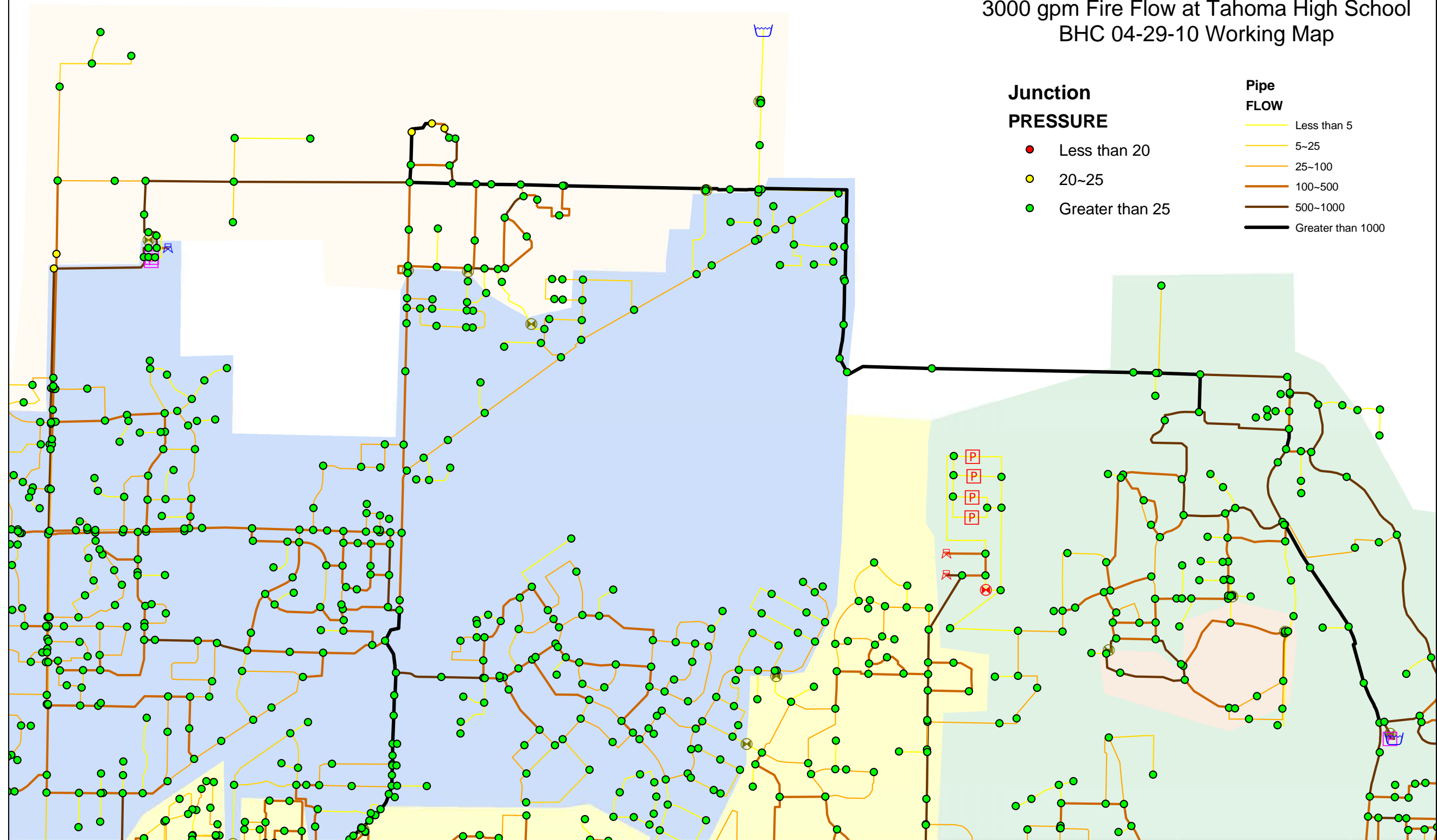
3.4.6.1 *Survey/Geotechnical Schedule*

Once the BORD has been completed and approved by the District and a scope and budget for design has been approved, work can begin on the surveying and geotechnical investigations of the selected alternative. The level of effort required for the geotechnical investigation will be dependent on the type of construction proposed as greater geotechnical detail is required for an HDD project than open trench construction.

3.4.6.2 *Easement Acquisition Schedule*

The level of effort required for easement acquisition is dependent on the willingness of the property owner to work with the District. If the property owner is willing to grant an easement the entire process can be accomplished in a couple of weeks. If the property owner is not willing, it may take longer to negotiate for the easement or possibly go through the condemnation process. It is expected that the easement process could be completed in a two month time period during the design phase.

Covington Water District M-34 Project
 770 Zone Supply Along SE 248th Street
 3000 gpm Fire Flow at Tahoma High School
 BHC 04-29-10 Working Map



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FIGURE
 NO.
19

3.4.6.3 Design Schedule

A three step process has been identified for the design phase of the project. First, a 60% design will be submitted for review by the District. Revisions will be incorporated and refined for a 90% submittal before the Final design is submitted. A five month process for the design phase of the project is identified.

3.4.6.4 Permitting Schedule

The major factor affecting the project schedule for Alternative 4 will be the need to obtain a Corps of Engineers permit for the crossing of the tributary of Jenkins Creek. It is likely that a Corps permit will be required whether the line is constructed using open trench construction or by horizontal directional drilling. It is possible that it will take less time to obtain the permit if the line is constructed using HDD. In an attempt to reduce the overall project schedule, it is recommended that permits are submitted based on the 60% design. Based on an estimate of 6 to 9 months to acquire a Corps permit, 6 months was used to estimate the length of the permit process for Alternative 4. This is different than Alternative 1 and 2, as it is generally easier to cross a tributary than a salmon bearing stream in the eyes of the Corps. This will still be more than enough time to acquire the additional permits required beyond the Corps permit.

3.4.6.5 Construction Schedule

Ideally, this project should be constructed in the summer when the water in Jenkins Creek and associated tributary's are at their lowest. Based on 2009 site visits, there is evidence that the water in Jenkins Creek dries up in the summer, although it is not known at what depth the groundwater shows up. Table 22 summarizes the anticipated time for each of the items listed above along with a proposed construction schedule showing the construction in the wetland occurring in the summer months.

Table 22 Alternative 4 Schedule Alternatives Analysis Covington Water District														comment from Alternative 1.											
		2010								2011															
		J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D					
Design																									
Predesign																									
Survey/Geotech																									
Final Design																									
Easement Acquisition																									
Permitting																									
Construction																									
Transmission Main Online																						◆			

Same scheduling
comment from
Alternative 1.

3.4.7 Cost

3.4.7.1 *Wetland Mitigation*

Assumptions for the basis of cost for Alternative 4 wetland mitigation are the same as those outlined for Alternative 1. The general estimated cost for restoration is \$120,000. For restoration plus 4:1 wetland mitigation the cost range is estimated at \$380,000 to \$440,000.

3.4.7.2 *Easement Valuation Formula*

The easement valuation formula is described earlier in this report.

3.4.7.2.1 Time Assumed for Temporary Construction Permit Valuation

This alignment assumes typical open-cut trench construction for the majority of the construction. With typical production rates of approximately 200 feet per day, including final surface restoration, it is expected that construction will run for approximately 4 months. The method selected for crossing the tributary to Jenkins Creek poses a potential for slower per-day production in this limited area. The time for each parcel is included in the individual parcel calculation.

3.4.7.2.2 Easement and Permit Values

This alignment requires easements and temporary construction permits from the following land owners, with the fees calculated and shown per the standard formulas. These calculations are based on preliminary easement sizing, which would change slightly during final design (Table 23). For all three of these easements, the fee value was reduced to a 0.1 multiplier due to the severely limited potential use of the easement area by the owners.

Table 23 Easement and Permit Fees – Alternative 4 Alternatives Analysis Covington Water District					
Parcel Number	Owner	Easement Size (ft²)	Easement Fee (\$)	Temp. Permit Size (ft²)	Temp. Permit Fee (\$)
202206-9038	Bartholomew	6,600	\$1,125	19,800	\$270
202206-9023	Jim Hawk	300	\$200	900	\$48
Totals			\$1,325		\$318

3.4.7.3 *Infrastructure Improvements*

The infrastructure improvement costs have been broken into several areas depending on the type of construction being proposed. Costs have been estimated depending on whether the proposed 16-inch transmission main is being constructed in an existing ROW, easement, wetland, or stream crossing. The costs include construction of the proposed improvements from the 770 zone, through the crossing of SR 18, all the way to the intertie at SE 240th Street and 196th Avenue SE.

Table 24 summarizes the location of the proposed construction including lengths and the estimated cost for the infrastructure improvements for Alternative 4.

Table 24 Infrastructure Improvements – Alternative 4 Alternatives Analysis Covington Water District					
Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	16-inch DI Water in ROW	3,950	LF	\$175	\$691,250
2	16-inch DI Water in Easement	1,190	LF	\$150	\$178,500
3	16-inch DI Water in Wetland Open Trench	200	LF	\$300	\$60,000
4	Stream Crossing (in ROW)	1	LS	\$25,000	\$25,000
5	PRV Station	1	LS	\$100,000	\$100,000
6	16-inch DI Water in ROW (north of SR 18)	2,700	LF	\$175	\$472,500
				Subtotal	\$1,527,250
				Tax (8.6%)	\$131,344
				TOTAL	\$1,658,594

Due to the likelihood of the tributary of Jenkins Creek being dry during the summer months, we did not evaluate this alternative using HDD construction methods. However, horizontal directional drilling may be considered for Alternative 4 during the design phase of the project. If so, Alternative 4 will have similar risks and cost benefits to the other alternatives when considering trenchless construction methods.

3.4.7.4 Summary

Table 25 summarizes all of the anticipated costs associated with Alternative 4. The table includes costs for permit fees, wetland mitigation, engineering (design, permitting, and construction), easement costs, and construction costs. The engineering costs are based on 25% of the anticipated construction cost without sales tax and the District legal and administration costs are 7% of the construction cost without sales tax. We have also included a 20% contingency factor to account for additional project uncertainties.

Table 25 Total Project Cost – Alternative 4 Alternatives Analysis Covington Water District	
Description	Costs for Open Trench Construction
Construction Cost w/WSST	\$1,658,594
Engineering (Design, Permitting & Construction)	\$381,813
Permit Fees	\$4,600
Easement Costs/Temporary Construction Permits	\$1,643
District Legal & Administration	\$106,908
Wetland Restoration & Mitigation	\$440,000
Subtotal	\$2,593,557
Contingency (20% rounded)	\$519,000
TOTAL	\$3,112,557

4.0 SUMMARY

A brief discussion comparing Alternatives 1 through 4 within the Project Goals identified at Workshop No. 1 is presented in the sections below.

4.1 Cost

A summary of the total estimated project costs for each alternative is presented in Table 26. Alternative 3, upsizing the existing booster pump station, is the lowest cost alternative overall, and Alternative 4 provides the lowest cost option amongst the alternatives containing a new transmission main.

Table 26 Project Cost Summary Alternatives Analysis Covington Water District	
Alternative	Costs for Open Trench Construction
Alternative 1 (Modified) – Open Trench	\$3,685,680
Alternative 1 (Modified) - HDD	\$3,491,646
Alternative 2 – Open Trench	\$4,318,307
Alternative 2 – HDD	\$4,168,818
Alternative 3	\$1,756,896
Alternative 4	\$3,112,557

Change 2011
references to 2012.
Call it good.

4.2 Schedule

The estimated time when the new transmission main or booster pump comes online is nearly identical for all alternatives. Alternatives 1 and 2 have an anticipated completion date of Early November 2011. Alternatives 3 and 4 have anticipated completion dates of Early October 2011. It is possible Alternative 3 could have a shorter time frame if the King County building permit can be obtained faster than the 6 months anticipated. **Level of Service**

Modified Alternative 1 and Alternatives 2 through 4 all meet the District's design criteria for delivery pressure and fire flow requirements. Alternatives 1 and 2 still require the use of reverse check valves in order to meet required design criteria. Alternative 3 also results in a level of service not ideal to the District. Upsizing the booster pump station means the 650 zone is still reliant on a pump station connected to a lower HGL for water service, whereas Alternative 1, 2, and 4 provide a passive connection to a pressure zone located at a higher HGL.

4.3 Property Acquisition

The alternatives have varying levels of complexity when considering property acquisition and of course it is very difficult to determine how property owners will respond to easement requests. Alternative 3 requires no permanent easements, and Alternative 4 minimizes the number of required permanent easements while maximizing the use of the platted ROW.

4.4 Environmental Impact

Alternative 3 will have minimal environmental impact compared to the other alternatives. The pump station expansion will occur on City property and not disturb any new land. Other piping improvements occur within existing road prisms, with the exception of a single small stream crossing. Alternatives 1, 2, and 4 pass through designated wetland areas, which will require more stringent mitigation and restoration requirements.

4.5 Permitting

The length of time required for permitting each of the alternatives is approximately 6-7 months. The key permit for Alternatives 1, 2, and 4 is the Army Corps of Engineers permit required for creek crossings. The key permit for Alternative 3 the King County building permit required for the pump station expansion. The level of effort required to prepare the permits varies widely amongst the alternatives. The ROW and clearing and grading permits needed for every alternative the City of Covington and/or King County are considered easy or only moderately difficult to prepare. The HPA permits required from Washington Department of Fish and Wildlife are expected to be difficult for Alternative 1 and 2 due to the wetland quality, moderate for 4, and relatively easy for Alternative 3. The Corps permits should have levels of preparation difficulty similar to those required for the HPA permits, though no Corps permit is required for Alternative 3. The permitting process for obtaining

the King County building permit required for Alternative 3 can be unnecessarily difficult, but can be eased somewhat through the use of pre-submittal conferences with the County.

4.6 Operations and Maintenance

Alternative 3 will have little or no impact to operations and maintenance procedures beyond what is currently required for the booster pump station currently serving the 650 zone. However, this alternative will still rely on generators for any power outages or emergency supply conditions. The remaining alternatives have the majority of the alignment located in or near improved ROW or access easements, providing ease of operations and maintenance. The challenges arise when the lines leave the easily accessible areas into heavily forested land or wetlands. In these areas access would be difficult but possible if construction is done using open-trench methods, and nearly impossible for portions constructed using HDD due to the depth required for traversing slopes and streams. The length of the alignment with difficult access is the shortest for Alternative 4, followed by Alternative 2, with Alternative 1 being the longest.

4.7 Constructability/Risk

Construction of Alternative 3 is low risk and relatively easy, as there is adequate access and room for construction at the existing pump station site. The only portion of construction that may prove moderately risky or difficult is the creek crossing for the section of transmission main replacement. Alternatives 1, 2, and 4 all have higher levels of risk associated with stream and wetland crossings, though the risk is anticipated to be lower with Alternative 4, as the creek is expected to dry up almost entirely during the summer. The high water table in the areas surrounding the creek crossing will likely require dewatering for all three alternatives. If HDD is to be considered to help ease the relatively significant environmental impacts for Alternatives 1, 2, and 4, further geotechnical exploration is required as the current probability of success is estimated at 50%.

4.8 Summary Table

The level of impact and issue for each project goal is summarized in Table 27. This table was refined at Workshop #3 – Alternative Selection. The designations for the symbols in the table are as follows:

- High Impact
- Medium Impact
- Low Impact

5.0 RECOMMENDATION

The District prioritized three goals as critical to alternative selection: keeping project cost down, expediting the project schedule, and meeting the District's level of service criteria. Examination of Table 27 reveals Alternative 3 would be the clear choice based on cost and several other decision criteria; however, it would not meet the District's level of service goal as it depends on pumping infrastructure. Of the remaining three alternatives that can meet the District's level of service criteria, Alternative 4 is favored over Alternatives 1 and 2 for Cost and Property Acquisition. The remaining criteria were neutral amongst the other alternatives having no net impact on alternative selection. Therefore, based on the available data and alternatives presented for this analysis, Alternative 4 is the preferred choice moving forward.

Table 27 Alternatives Comparison Summary Alternatives Analysis Covington Water District								
	Cost (Relative)	Schedule	Level of Service	Property Acquisition	Environmental Impact	Permitting	Operations & Maintenance	Constructability & Risk
Alternative 1 (Modified)	●	●	●	●	●	●	●	●
Alternative 2	●	●	●	●	●	●	●	●
Alternative 3	●	●	●	●	●	●	●	●
Alternative 4	● ●	●	●	●	●	●	●	●